Evaluating the impact of capital expenditure in further education
A REPORT FOR LEARNING AND SKILLS COUNCIL

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Evaluating the impact of capital expenditure in further education

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Executive summary

The Learning and Skills Council (LSC) provides grants to support FE colleges’ capital expenditure and is interested in assessing the impact this capital expenditure has on colleges’ performance.

In the past, Frontier Economics carried out two evaluation studies estimating the impact of capital expenditure on college outcomes, including participation and success. The first, in 2005, used data on investment and outcomes for the period 1999-00 to 2003-04. The analysis was updated in 2006 to include an additional year of data (2004-05). These studies were based on the existing data sources¹ and did not involve any primary data collection.

In 2007, the LSC commissioned Frontier Economics to undertake a further study. This new study builds on our previous work, but also expands and develops it in a number of ways:

- **It is based on more accurate data** – We have undertaken primary data collection, contacting FE colleges directly and asking them to provide us with information, which was not available before.

- **It assesses the impact of capital expenditure on a wider set of outcomes** – In the previous studies, we focused on two college performance indicators – participation and success. Although these indicators are important, they are not the only outcomes that colleges monitor and aim to improve. In this study, we look at a wider set of indicators, estimating the impact of capital expenditure on participation, success, retention, achievement and fee income. Moreover, for the first time, we are able to analyse separately the impacts on 16-18 year olds and on adult learners (19+).

- **It extends the analysis by taking into account more recent capital expenditure projects** – The average size of capital expenditure projects undertaken by FE colleges has been increasing dramatically over the last ten years. By extending the analysis to include two more years, we attempt to capture the impact of more recent larger projects. However, when doing so, we need to be careful not to count those projects that have not yet been completed. The data on capital expenditure projects (collected from colleges) allows us to make this distinction.

- **It uses qualitative analysis (based on case studies) to help understand how capital expenditure impacts upon performance and to identify key factors that make capital expenditure projects successful** – We use the Treasury Green Book appraisal framework to assess individual projects and to identify common factors leading to successful outcomes. We also use the case studies to explore the impact of capital investment on those aspects of college performance that at present are difficult to quantify, such as employer engagement and environmental sustainability.

¹ The Individual Learner Record data (ILR) and the LSC capital investment application database.
Quantitative analysis

The general approach to the quantitative study is similar to the one we used in our previous research, i.e. we use econometric techniques to estimate the effect of capital investment on the change in performance of colleges over time (before and after capital investment), while at the same time taking into account differences in other college characteristics that might have an impact on the observed outcomes.

Our econometric analysis is based on the sample of 180 colleges that completed and returned our data template. This represents 53% of all colleges undertaking capital expenditure in the last decade. The sample is representative of the population of colleges as a whole, based on colleges’ observable characteristics (size, location, trends in participation and success rates).

Capital expenditure projects

When analysing the colleges’ responses, we find that the average size of individual projects is changing considerably over time (Figure 1), from £1.7m for projects completed in 1999-00 to £9.6m2 for projects completed in 2006-07.

It should be noted that projects more recently approved by the LSC are significantly greater in size. An average project with expected completion date in 2009-10 is £20.7m according to data provided by the LSC (see Figure 1). The impact of these projects, however, cannot yet be assessed, because they are still ongoing.

For the completed projects, we find that colleges vary considerably in terms of how much they had invested in their estate between 1998-99 and 2006-07 (Figure 2). The average amount spent is £9.8 million. However, 45% of the colleges invested less than £4 million, while 7% invested more than £30 million.

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2 All values are provided in 2008 prices.
Relating the amount spent by each college to the changes in participation, success and retention (while taking into account differences in other characteristics) allows us to estimate the impact of capital expenditure on college performance.

**The impact of capital investment on participation**

Overall, we find that capital expenditure has a significant positive impact on participation. Our regression analysis – which takes into account differences in college characteristics (type, size, region, proportion of adult learners) - shows that for every additional £1 million spent, participation increases, on average, by 111 learners.

When the overall impact is disaggregated into the effect on 16-18 year olds and adult learners, we observe that every additional £1 million spent leads to:

- an increase in the number of 16-18 year old learners by 46 individuals; and
- an increase in the number of adult learners by 65 individuals.\(^3\)

To put these numbers in the right context: in 2006/07, an average college had 2,200 16-18 year old learners and 5,700 adult learners. While the results appear to indicate that capital expenditure is more effective in attracting adult learners than 16-18 year old learners, it should be noted that a higher proportion of 16-18 year old learners were enrolled on full-time courses during the period of study. We cannot therefore rule out the possibility that capital expenditure could have a stronger effect on the total number of 16-18 year old learner hours than on the total number of adult learner hours.

Nonetheless, the impact on adult learners is particularly worth emphasising. As Figure 3 demonstrates, the numbers of adult learners have been in decline in the last three years (due to a reduction in the LSC funding available for adult learners and its re-focussing on longer, qualification bearing programmes). While the

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\(^3\) These results are statistically significant.
overall trend is negative, our analysis indicates that capital investment, to some extent, counteracts this negative trend, i.e. colleges that spend more on improving the quality of their estate are attracting more (or losing fewer) adult learners compared to colleges that spend less.

The impact of capital investment on learner success

We use college success rates, calculated by the LSC, as the main measure of learner success. These success rates, defined as the number of qualifications achieved as a percentage of the number started, are based on the Individual Learner Record data (ILR) and are used by the LSC as part of their Performance Review and by OFSTED during inspections. This measure is equivalent to the retention rate\(^4\) multiplied by the achievement rate\(^5\).

For the colleges in our sample, average success rates exhibited a steady increase from 59% in 2000-01\(^6\) to 77% in 2006-07 (Figure 4).

\(^4\) The retention rate is defined as the number of qualifications completed as a percentage of the number started.

\(^5\) The achievement rate is defined as the number of qualifications achieved as a percentage of the number completed.

\(^6\) Please note that these measures are calculated by the LSC and are not available for 1998/99 and 1999/00.
As with participation, we estimate the impact of capital expenditure on the change in colleges’ success rates. We find that every additional £1 million of capital expenditure increases the college success rate by nearly 0.1 percentage points. To put it differently, a typical £10 million project improves the success rate by nearly 1 percentage point. This result is statistically significant and robust to changes in regression specification.

Our statistical analysis also provides some insights into what it is that drives this relationship between capital expenditure and the change in success rates.

- Capital expenditure appears to increase success rates primarily by persuading learners to see their qualifications through to completion. We find that every additional £10 million of capital expenditure increases a college's retention rate by 0.6 percentage points. Again, this result is statistically significant and robust to changes in regression specification.

- The effect of capital expenditure appears to be particularly strong for colleges with success rates that are initially above average. For these colleges each additional £10 million of capital expenditure increases the success rate by more than 2 percentage points.

- Capital expenditure also seems to have a significant effect on the success rate for colleges with success rates that are initially very low. More specifically, for colleges with initial success rates in the bottom 20% of the sample we found that for every additional £10 million of capital expenditure the success rate increases by nearly 2 percentage points. No statistically significant relationship was found for colleges with success rates that are only slightly below average.

**Qualitative analysis**

As part of the study into the impact of capital expenditure on educational outcomes, we have carried out a series of case study visits. In total, we visited 14 further education colleges that had recently undertaken a major capital expenditure project.
We assess these projects using the Treasury Green Book appraisal framework (illustrated by Figure 5). More specifically, we focus on each stage of the project evaluation (i.e. rationale, objectives, appraisal, etc.), assess the existing practices and make recommendations on how these practices may be improved.

**The rationale for a capital expenditure project**

In order to be effective, each capital project needs to have a sound rationale. Colleges need to be forward-looking and to identify what would happen in the next 5-10 years if they choose to ‘do nothing’. This scenario then needs to be compared with what would happen if they did invest in their estate.

Under both scenarios colleges need to assess potential implications for participation (in total and for individual groups), learner success and their ability to generate income and to engage with employers. Colleges may also be looking to achieve other objectives. When thinking through the implications in both cases, the colleges need to take into account demographic trends in the area, changes in the labour market, competition from neighbouring colleges, etc. This comparison should help colleges to determine whether they have a sound rationale for undertaking a capital investment project.

Our case studies demonstrate that all colleges go through this process. In many cases identifying the rationale was simple – the existing college estate was outdated or unable to meet regulatory requirements. Therefore, ‘do nothing’ was simply not an option. There were also other reasons for undertaking a capital build, e.g. rationalisation of the college estate following a merger or relocation to a more favourable location in the town.

We recommend that going forward colleges should maintain the good practice of identifying a sound rationale for their capital projects. We expect that in the future this stage would require more work, as reasoning along the lines “we will need to close down the college otherwise” would be less and less applicable.
Setting objectives for a project

This is a very important step. Without setting SMART objectives, it is virtually impossible to assess later whether the project is successful.

The majority of colleges we visited tended not to express the objectives of the capital expenditure project as clearly defined, measurable targets. The requirement by the LSC to include forecast student numbers in the application for funding meant colleges set targets for participation more often than targets for success and other performance indicators. For example, with some exceptions, increased employer engagement did not appear to be an objective at the start of the project and was identified more as a bonus once the project was completed. Further, the Government is becoming increasingly interested in the socio-economic impact on communities of major college developments, most of which are situated in the centre of communities.

We recommend that colleges focus more on this stage of project planning and evaluation process. We also believe that the LSC and its successor bodies can play a more active role by encouraging colleges to articulate their objectives more clearly in their grant application forms.

Appraising the options and planning a project

The appraisal process involves identifying different options and choosing the one that allows the college to achieve its objectives in the most cost-effective way (i.e. represents the best value for money).

We found that colleges do consider a number of alternatives, focusing specifically on location, finance and building design. In particular, individuals we spoke to mentioned the importance of good transport links and benefits of locating more centrally within a town. When designing the building itself, the aim of colleges was to create a building which was flexible (in terms of how space was used), secure, visible to learners and employers.

We believe that options appraisal would be more straightforward if colleges set SMART objectives (see the previous stage). Consultations with local authorities, employers and wider community should also help identify the optimal option. While there are examples of this happening already, colleges are often too time-constrained to undertake detailed consultations.

Finally, sharing good practice within the sector should also be encouraged. When planning their capital build, colleges find it useful visiting other colleges, which have recently completed projects, in order to learn from their experience.

Implementing and monitoring a project

Our focus in this area was not on how to manage projects in general, but on particular issues which apply to further education colleges. It appears that the most critical issue at this stage is to ensure that the project is delivered on time because even a short delay may negatively affect enrolment. Our discussions
indicated that a clearly defined decision making structure across the Governors, Principal and Senior Management Team of a college was important for the smooth running and timely delivery of a project.

Another potential issue during the implementation stage is minimising disruption for learners and staff. It appears that most colleges managed this well. Participation does not seem to have been adversely affected during the building phase. We found that keeping the staff and learners informed about the progress of building works contributed to this positive outcome.

**Evaluating project outcomes**

The next stage is the post-project evaluation, when colleges assess whether they have met their set objectives.

Typically, the colleges we visited had not carried out a comprehensive post-project review. The evidence presented on outcomes in terms of participation, learner success rates, employer engagement and sustainability, therefore, tended to be more qualitative in its nature.

- Most colleges believed that a new building has a positive impact on participation and in most cases could provide evidence of the impact. We attribute this to the fact that participation is the only objective where colleges were more likely to set specific targets and to evaluate their progress.

- Colleges described capital investment as having an impact on success rates primarily through increased retention rather than through achievement. This is consistent with our econometric analysis. We believe that colleges could have achieved better results, had they set more specific and measurable targets both for success.

- The principal effect of the new building on employers is to signal that the college is successful and, therefore, is a good business partner. However, colleges (with very few exceptions) provided little evidence to demonstrate whether their capital projects helped them to improve employer engagement.

- Finally, evidence on the contribution of new buildings to sustainability is mixed. Although some measures to improve sustainability have been introduced, this was not high on the agenda when these projects were built and such measures often proved too costly to implement. Since the period under review, the LSC has instituted new requirements on sustainability and energy efficiency, the impact of which could be assessed in future studies.

Based on this qualitative analysis, our main recommendation to colleges, starting a capital expenditure project, would be to set explicit medium-term (5 to 8 years)
targets for participation, success, retention, employer engagement, and community impact to monitor progress towards these targets over time.
1 Introduction

The Learning and Skills Council (LSC) provides capital grants to support capital projects in FE colleges and is interested in assessing the impact this capital expenditure has on colleges’ performance.

In the past, Frontier Economics carried out two evaluation studies estimating the impact of capital expenditure grants on college outcomes, including participation and learner success rates. The first, in 2005, used data on investment and outcomes for the period 1999-00 to 2003-04. The analysis was updated in 2006 to include an additional year of data (2004-05). These studies were based on the existing data sources\(^9\) and did not involve any primary data collection.

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- **It is based on more accurate data** – We have undertaken primary data collection, contacting FE colleges directly and asking them to provide us with information, which was not available before.

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\(^9\) The Individual Learner Record data (ILR) and the LSC capital investment application database.
In this report, we first discuss our quantitative analysis. Its aim is to estimate the impact of capital expenditure on college performance indicators:

- participation;
- success;
- retention;
- achievement; and
- college ability to generate income.

This is followed by the qualitative analysis, based on 14 case studies. The purpose of the case studies was to evaluate individual capital investment projects, assess the existing practices and make recommendations on how these practices may be improved.

The case studies are also used to gauge the impact of capital expenditure on those outcomes that are difficult to quantify (such as employer engagement and environmental sustainability).

The report is structured as follows:

- Chapter 2 – sets out our conceptual framework for the quantitative analysis.
- Chapter 3 – describes the data collection process
- Chapter 4 – describes the data
- Chapter 5 – presents our econometric analysis and findings
- Chapter 6 – presents our qualitative analysis.
2 Our conceptual approach to the quantitative analysis

This chapter sets out the methodology used for the quantitative study. The key objective of the analysis is to identify the impact that capital investment projects have on outcomes in the further education sector. In our previous studies, we have developed a two-pronged approach that allows us to tackle this issue. It consists of:

- A conceptual framework that clearly identifies the outcomes capital expenditure is likely to affect and the mechanisms through which these effects occur.
- An analytical framework that enables one to isolate the effect of capital investment on outcomes from other effects.

In this study, we further develop and refine this methodology, taking into account recent developments in the sector.

2.1 THE CONCEPTUAL FRAMEWORK

First, we discuss the conceptual framework for the study. That involves:

- identifying the outcomes that might be affected by capital expenditure
- understanding different types of capital expenditure
- describing the ‘transmission’ mechanisms, i.e. those channels through which capital investment projects might affect the outcomes of interest.

This framework was developed at the outset of the study. However, it has been further refined throughout the project, in particular at the data collection stage and through the case studies.

2.1.1 Identifying outcomes of interest

The first step is to identify the outcome measures that might be affected by capital investment. Ideally, an evaluation of any educational expenditure would aim to establish the effect of that expenditure on the lifetime earnings and employability of the affected learners. However, this is a very difficult and time-consuming exercise. Indeed, we would need to track people over a long period of time (a few decades) in order to assess to what extent their earnings are affected by this expenditure.\(^\text{10}\)

An alternative more pragmatic approach is to assess whether capital expenditure has any significant impact on those outcomes that are known to be correlated

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\(^\text{10}\) Strictly speaking, we would need to assess whether earnings of those, attending a college that has recently completed a capital expenditure project, are higher than earnings of their counterparts who went to a college with no capital expenditure over the period.
with future wages\textsuperscript{11} and are more straightforward to measure. These outcomes are:

- participation, i.e. the number of people enrolled; and
- success, i.e. the proportion of learners who start courses and who successfully complete their courses and receive relevant qualifications.

These are the main outcomes we focus on in this study. However, there are also other outcomes, which either:

- help colleges to achieve their key objectives - e.g. higher retention and achievement contribute to learners’ success; or
- reflect wider LSC objectives, which are important in their own right - e.g. colleges’ ability to generate fee income, engage with employers and improve environmental sustainability.

These outcomes may also be affected by capital expenditure and, therefore, are investigated as part of this study.

2.1.2 Types of capital expenditure projects

In principle, there may be different types of capital expenditure projects that might affect colleges differently. In the previous report, for example, we suggested that there might be an argument for distinguishing between (i) projects involving a new build and (ii) a refurbishment of an existing building. This distinction appears to be less relevant at present. Indeed, by 2006/07 most colleges had completed several projects, which combined both elements, i.e. some refurbishment and a new build.

It also appears that colleges differ in terms of their approach to major capital investment. Some prefer to do it in stages\textsuperscript{12} and, therefore, apply for more than one grant, while others approach it as one project. Therefore, a distinction between one major and several smaller projects, in some cases, may be arbitrary.

Given these somewhat blurred boundaries between different projects (or stages of the same project), it appears that we should evaluate the impact of total amount of money spent by each college rather than the impact of individual projects.

While in the quantitative analysis it may be difficult to classify capital expenditure projects in other ways rather than total amount of money spent, in our case studies we do investigate:

- what makes individual projects successful; and
- whether some projects perform better than others (see Chapter 6 for more details).

\textsuperscript{11} There exist a number of studies estimating the returns to various academic and vocational qualifications. Please see Frontier report for the LSDA (2005) for more details.

\textsuperscript{12} This is more likely to apply to large colleges with multiple sites.
2.1.3 The transmission mechanisms

The next step is to determine how capital expenditure might affect the outcomes under consideration. We recognise that the transmission mechanism is likely to be complex and work through different channels. For example, a major capital expenditure project might lead to an increase in participation because:

- the college has more physical space and, therefore, can accommodate more learners;
- the project enables the college to offer new courses, which are in high demand;
- the project contributes to brand recognition, which also boosts enrolment;
- the new building is located more conveniently; therefore, more people are joining.

Similarly, learners’ success is likely to improve because:

- both learners and teachers are more motivated;
- learners are better matched to courses (due to increased participation and expanded curriculum);
- new equipment and IT resources, which are installed as part of the project, facilitate learning;
- colleges can be more selective due to increased demand.

Note that not all channels necessarily ‘work’ in the same direction. For example, if, as an outcome of a capital expenditure project, a college aims to increase the recruitment of learners who are currently NEET or from other ‘hard to reach’ groups, the overall success rates might not change (or even fall) because of the change in the student mix.

Another example of an outcome, where the effect of capital expenditure may be uncertain, is ‘environmental sustainability’. While colleges do incorporate environmentally friendly technologies in their new buildings, the fact that they need to install more electronic equipment might lead to an increase (rather than a reduction) in their post-project utility bills.

Overall, the combined (net) effect of capital expenditure on specific college performance indicators is not pre-determined and requires careful investigation. In the rest of the report, we explore these effects both quantitatively and qualitatively.

2.2 THE ANALYTICAL FRAMEWORK

In the last section, we set out the ways in which capital investment may have an impact on college outcomes. However, it is likely that other factors may also have an impact on these outcomes. In order to ensure that the impact of these
Our conceptual approach to the quantitative analysis

factors does not obscure the impact of capital expenditure on a college, we need to create a methodology that controls for them.

To evaluate correctly the impact of capital investment one would, in an ideal world, compare the performance of each college that received capital investment with the performance of the same college, had it not received any capital investment. Obviously, it is impossible to observe what would have happened to a college if it did not receive investment. The objective of the analytical framework, therefore, is to identify a counterfactual that gets as close as possible to this idealised observation. There are two ways that one might go about constructing a counterfactual:

- compare the performance of each college with capital investment in the time period before the investment and the time period after the investment; or
- compare the performance of each college with capital investment (the treatment group) with colleges that did not receive capital investment (the control group).

The latter approach requires the control group of colleges to be sufficiently similar to the treated group for the comparison to be meaningful. This is usually achieved by “matching” treated and untreated (control) colleges based on their observable characteristics (size, location, initial success rate, etc.). Such matching, however, is difficult to achieve at present, given that only 35 out of 397 colleges (less than 9%) have not undertaken any capital investment projects in the last ten years.

Therefore, we adopt the first approach and estimate how the size of capital investment projects (i.e. total amount of money spent) impacts on the changes in college performance before and after the investment.

Note, however, that capital investment might not be the only factor that causes changes in colleges’ performance over time. There may be other external factors that also lead to changes in outcomes. For example, if a particular area experiences population growth, it might boost participation in local colleges – a change unrelated to capital expenditure.

An advantage of econometric analysis (more precisely, multiple regression analysis) is that it allows one to disentangle the impacts of several factors. In our example, it would allow us to isolate the effect of capital expenditure from the regional effect. More generally, in our regression analysis we take into account several factors that might influence changes in college performance. These are:

- college location (region);
- type (FE, Sixth form, specialist);
- size (the number of learners before capital projects had been implemented);
- the split between 16-18 year olds and adult learners (19+) (might affect participation due to changes in LSC adult funding, etc.).
In the following chapter, we describe our data collection process and the data available for the analysis.
3 Data collection

In our previous studies, we relied on existing data sources, such as the Individual Learner Record data (ILR) and the LSC capital grants approval database, to collate the data for the analysis. In this study, we rely on those data sources (the ILR, the LSC capital expenditure approval database and the Estate Management Data Exchange (eMandate)), but only as a starting point. We have designed college-specific data templates (i.e. Excel spreadsheets with college-specific information) in order to send them to colleges for data collection and verification.

Overall, we sent the templates to 376 colleges.

Below, we discuss the stages of the data collection process:

- Stage 1 – The template design and piloting
- Stage 2 - Data collection.

3.1.1 Template design and piloting

Our original template was designed to ask colleges about a number of variables on which we wanted to collect information, including quantitative measures of:

- employer engagement (defined as employer fee income);
- tuition fee income; and
- environmental sustainability (e.g. total energy consumption, and heat and light cost per sq. m).

We pilotted the template with five colleges in order to find out whether they would be able to complete the questionnaire. The piloting stage was successful, with 4 out of 5 colleges returning their forms on time.

The pilot responses indicated that some data could be easily collected or verified (capital expenditure data and participation figures), while other variables appeared to be more problematic. More specifically:

- the colleges did not have historical data on employer fee income and sustainability measures;13 and
- the definition of tuition fee income appeared to vary across colleges and over time (some colleges included employer income in tuition fee income, while others did not).

Therefore, we had to amend the template, excluding those variables, where the data was not available14 and replacing “tuition fee income” with “dependency on

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13 The data was limited to the last 2-3 years, which was not sufficient for statistical analysis based on changes in indicators over time.

14 While we had to make our decision to exclude certain variables based on responses of 5 colleges only, it was clear from their responses, that other colleges would have similar difficulties providing this information, as in the past the colleges were not required to calculate these measures.
LSC income” – a similar, but more reliable measure of colleges’ ability to generate income.

Although we were unable to estimate the impact of capital expenditure on some college performance indicators, such as employer engagement and environmental sustainability, due to the lack of data, we have made a particular effort to investigate this qualitatively during the case studies (see Chapter 6 for more details).

Finally, some variables, which we were planning to use, such as success, retention and achievement rates, had been calculated by the LSC and did not require additional verification. These variables, therefore, were not included in the template.

3.1.2 Data collection

The data collection took place in July and August 2008. We contacted 376 colleges in England, 340 of which had undertaken capital expenditure projects in the last decade.

180 colleges completed and returned their forms. This represents 53% of all colleges with capital expenditure. Our analysis (in Annex 1) shows that these colleges are representative of the sector as a whole, based on their observable characteristics (participation, success, location, etc.).

The data collection proved to be very useful. It provided us with:

- Accurate and detailed information on capital projects undertaken by colleges:
  - Information on start and end date – allowing us to distinguish between completed projects and projects that are still in progress, and, hence, to estimate more accurately the impact of completed projects.
  - Information on actual costs – the previous studies were based on projected costs.
  - Errors in the data identified – e.g. duplicate projects and projects that never went ahead because applications were revised and resubmitted.

- Explanations for some significant changes in participation figures that could not be attributed to mergers or capital investment. In most cases these changes were attributed to changes in LSC funding priorities (reductions in funding for the 19+ age group and for some specific courses).

In the remainder of this report, we focus on the sample of the respondents. We first describe general trends in college performance indicators and then present our econometric analysis that estimates the impact of capital expenditure on college performance indicators.
4 Data description

In this chapter we briefly describe the data, i.e. we identify the trends in key college performance indicators:

- participation;
- success rate;
- retention rate;
- achievement rate; and
- fee income.

We also provide descriptive statistics for the capital expenditure data. This statistical information is important as it helps us to interpret the econometric analysis in the following chapter.

The headline descriptive statistics are given in Table 1 below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td></td>
<td>Participation rises steadily for 16-18 year old learners. For adult learners, participation initially rises and peaks in academic year 2002/03. It then declines to its lowest point in academic year 2006/07.</td>
</tr>
<tr>
<td>Success rate</td>
<td></td>
<td>The 16-18 year old success rates rise by 18 percentage points between academic years 2000/01 and 2006/07. For adult learners the rise is 15 percentage points.</td>
</tr>
<tr>
<td>Retention rate</td>
<td></td>
<td>Retention rates rise by 10 percentage points for 16-18 year olds between academic years 2000/01 and 2006/07. For adult learners the rise is 4 percentage points.</td>
</tr>
<tr>
<td>Achievement rate</td>
<td></td>
<td>Achievement rates rise by 13 percentage points for 16-18 year olds between academic years 2000/01 and 2006/07. For adult learners the rise is 14 percentage points.</td>
</tr>
<tr>
<td>Dependency on LSC</td>
<td></td>
<td>Dependency on LSC income changes little over the period.</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td></td>
<td>There is a steady rise in capital expenditure undertaken. Average capital expenditure per college is expected to rise steeply for 2009/10.</td>
</tr>
</tbody>
</table>

Table 1: Key findings of the descriptive statistics
4.1 PARTICIPATION

Participation is defined as the number of learners in FE colleges. Recent trends in participation for 16-18 year olds and adult learners have been very different, and are reported separately below. It should be noted that adult learners tend to take shorter, part-time courses whereas 16-18 year olds tend to take longer, fulltime courses. This prevents direct comparison of participation rates for adult and 16-18 year old learners.

Based on data from the Individualised Learner Record (ILR), participation for 16-18 year olds has increased steadily over time (Figure 6), while participation of adult learners has been falling since 2003/04 (Figure 7).

Figure 6: Participation of 16-18 year olds by academic year

Source: ILR data

Figure 7: Participation of adult learners by academic year

Source: ILR data

We have explored the decline in adult participation both quantitatively and qualitatively, asking colleges to provide reasons for the decline in their participation figures. It appears that the decline in the number of adult learners was caused by a change in LSC funding priorities affecting the type of courses typically taken by the adult learners group. 81% of colleges cited this reason when asked about the decline from 2004/05 to 2006/07.
For 16-18 year olds there was a positive skew in the change in participation for 16-18 year olds with most colleges experiencing an increase of between 0 and 750 students (Figure 8). For adult learners, participation in 2006/07 was slightly lower than in 1998/99. However, 32% of colleges experienced positive changes in adult learner participation over the period (Figure 9).

In our econometric analysis (see Chapter 5), we attempt to estimate whether capital expenditure contributes to these changes in participation and whether its impact is statistically significant.

4.2 SUCCESS RATE

The success rate is defined as the number of qualifications achieved as a percentage of the number started. It is equivalent to the retention rate multiplied by the achievement rate.

Data description
The success rate, retention rate and achievement rate are calculated by the LSC and used in its benchmarking analysis of the FE sector.

We observe that average success rates have been rising steadily over time for the 16-18 year old group. For 16-18 year olds, they have risen from 58% in 2000/01\(^\text{15}\) to 76.1% in 2006/07 (Figure 10). For adult learners, they have risen from 59.9% in 2000/01 to 75.3% in 2006/07, but the success rate peaks a year earlier in 2005/06 (Figure 11).

![Figure 10: Average 16-18 success rates by academic year](source: ILR data)

![Figure 11: Average adult learner success rates by academic year](source: ILR data)

When looking at individual colleges, we observe that:

- 60% of colleges improved their success rate by 10-25%;
- 21% of colleges improved their success rate by more than 25-40%; while
- 3% of colleges had a decline in their success rate (Figure 12).

For adult learners there is wider variation in changes in colleges’ success rates:

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\(^{15}\) Please note that these measures are calculated by the LSC and are not available for two previous years 1998/99 and 1999/2000.
• 54% of colleges improved their success rate by 10-25%;
• 19% of colleges improved their success rate by 25-40%; while
• 9% of colleges had a decline in their success rate (Figure 13).

As with participation, we want to explore whether capital expenditure contributes to these changes in success rates and to estimate the magnitude of the impact.

We also look at the components of the success rate – retention and achievement – in order to find out whether capital expenditure affects these two measures differently.

**Retention rate**

The retention rate is defined as the number of qualifications completed as a percentage of the number started. It increased by 10 percentage points for 16-18
year olds between 2000/01 and 2006/07 (Figure 14) and by 4 percentage points for adult learners (Figure 15).

![Figure 14: Average 16-18 retention rate by academic year](source:ILR data)

![Figure 15: Average adult learners retention rate by academic year](source:ILR data)

**Achievement rate**

The achievement rate is defined as the number of qualifications achieved as a percentage of the number completed. For 16-18 year olds, the achievement rate grew by 13 percentage points between 2000/01 and 2006/07 (Figure 16). For adult learners, the achievement rate grew by 14 percentage points between 2000/01 and 2006/07 (Figure 17).
4.3 DEPENDENCY ON LSC INCOME

The LSC would like to know whether colleges’ ability to generate fee income is linked to their recent capital expenditure. We have explored a number of different measures to capture this.

- “Tuition fee income” appears to be the most relevant measure. However, as was revealed through the pilot studies, its definition may vary over time and across colleges (for example, some colleges include income from employers). The data, therefore, is too volatile and not suitable for this analysis.

- “Dependency on LSC income” is defined as the percentage of the college’s income that comes from the LSC. Clearly, dependency on LSC income is inversely related to college fee income: as colleges’ ability to generate their own income goes up, their dependency on LSC income decreases. This measure appears to be more reliable and is used in this analysis.

Figure 18 shows that dependency on LSC income has been relatively stable, particularly between 2001-02 and 2006-07.
4.4 CAPITAL EXPENDITURE

In our study, capital expenditure is defined as the total amount spent by colleges on their capital investment projects, expressed in real terms\textsuperscript{16}.

Figure 19 shows average project size by year of operational use, i.e. the academic year when the college actually starts making use of the new buildings. We find that the average size of individual projects is changing considerably over time, from £1.7m for projects completed in 1999-00 to £9.6m for projects completed in 2006-07.

Projects more recently approved by the LSC are significantly greater in size. An average project with expected completion date within the financial years 2009-10 is £20.7m according to the latest data provided by the LSC. The impact of these projects, however, cannot yet be assessed, because they are still ongoing.

More generally, our sample period includes all projects completed between January 1999 and October 2006. These projects could potentially make an impact on changes in college performance between 1998/99 and 2006/07, while more recent projects could not.

\textsuperscript{16} More specifically, we express capital expenditure in 2008 prices, using GDP deflators, in order to be able to compare projects undertaken in different points in time.
For the completed projects, we find that colleges vary considerably in terms of how much they had invested in their estate between 1998-99 and 2006-07:

- the average amount spent by a college over the period is £9.8 million
- 45% of colleges invested less than £4 million; while
- 7% invested more than £30 million (Figure 20).

In the next section, we present our quantitative analysis, that is, using the regression techniques, we estimate the impact of capital expenditure on college performance indicators.
5 Regression analysis

In this chapter, we present the results from the quantitative analysis. This analysis used statistical techniques to investigate the effect of capital expenditure on participation and success rates at FE colleges. Two previous studies carried out by Frontier for the LSC also analysed these effects. This study updates the analysis by incorporating more recent capital expenditure projects. Other important distinctions of this study are:

- it is based on more accurate data, much of which has been directly verified by the colleges themselves;
- it broadens the analysis to assess the impact of capital expenditure on a wider set of outcomes – namely participation, success, retention, achievement and fee income; and
- it deepens the analysis to assess the impact of capital expenditure on these outcomes for different student subgroups.

The analytical results from this quantitative study are presented in three sections:

- the effect of capital expenditure on college participation rates;
- the effect of capital expenditure on college attainment rates (success, retention, achievement); and
- the effect of capital expenditure on colleges’ ability to generate fee income.

5.1 EFFECT OF CAPITAL EXPENDITURE ON PARTICIPATION

We are interested in establishing whether capital expenditure leads to more learners attending a college. To investigate this question, we studied the relationship between capital expenditure and the change in participation at colleges in recent years (please refer to Section 2.2 for further details). As discussed in Chapter 4, we had the following data at our disposal.

- Annual participation rates for each college between 1998-99 and 2006-07. This information was collated from the ILR and verified by the colleges that returned the questionnaire surveys. In addition to overall participation rates for these years, we had information for the following categories:
  - 16-18 year old learner numbers;
  - adult learner numbers; and
  - fulltime equivalent learner numbers.

This information was used to calculate the change in participation between 1998/99 and 2006/07 for each of these student categories at each college.
Total real capital expenditure for each college since 1998/99. This data was derived from data on all capital projects funded by the LSC since 1998/99. Projects with actual or estimated completion dates after October 2006 were not included in these total expenditure figures: we could not analyse the effects of capital expenditure on participation after this date because we did not have access to participation figures after 2006/07.

Given the need for reliable data, the sample was limited to the 180 colleges that had completed and returned the survey questionnaires verifying their capital expenditure and participation data since 1998/99 (see Section 3 for further information on the surveys). In addition to this, we excluded colleges with no capital expenditure at all between 1998/99 and 2006/07. These steps left us with a reliable data set consisting of 158 colleges.

5.1.1 Preliminary analysis

As a preliminary step it is useful to ask whether we can use this cleaned data to identify a visible correlation between capital expenditure and the change in participation for the 1998-2006 period. The scatter plot in Figure 21 plots relationship between these variables.

As can be seen from the upward-sloping trend line, there is a positive correlation between capital expenditure and the change in participation for the colleges in the sample. As discussed in Section 4.1, the net change in student numbers between 1998/99 and 2006/07 was negative for many colleges. However, the scatter plot provides us with some indication that capital expenditure contributed positively to participation and might have helped reduce any decline in overall participation numbers over the period.

Nonetheless, one should be careful when interpreting this graph:

- This graph aggregates participation information for adults, young people, full-time and part-time learners, so is too crude an indicator to inform future

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17. Total real capital expenditure was derived by converting all reported costs to real terms using GDP deflator statistics from HM Treasury and then tallying these project costs for each college.
investment decisions. Analyses that are broken down by learner age and programme type (see below) are likely to be more informative from a policymaking perspective.

- A simple correlation does not necessarily indicate a positive causal relationship between capital expenditure and the change in participation. For example, the graph could simply indicate that capital expenditure is correlated with another variable that acts to increase participation. In order to rule out such alternative explanations, we need to control for other factors that might explain the change in participation.

### 5.1.2 Regression analysis

In order to overcome these analytical limitations, we use multiple regression analysis to establish whether capital expenditure had a significant effect on the change in participation between 1998-99 and 2006-07. As discussed in Chapter 2.2, multiple regression analysis allows us to test the statistical significance of the relationship between capital expenditure and the change in participation, taking into account other factors that might have affected the change in participation over the period.

**Regression model specification**

Table 2 lists the college characteristics included as control variables in the regression analysis, along with the rationale for their inclusion. For further information on the model specification used for the regression analysis, please refer to Annex 2.
### Table 2: College characteristics used as control variables in participation regressions

<table>
<thead>
<tr>
<th>College characteristic</th>
<th>Rationale for inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial college size (total participation in 1998)</td>
<td>It may be more difficult for large colleges to expand further; it is also possible that larger colleges are more likely to undertake more capital expenditure.</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>Including age profile controls for possible effects of recent changes in LSC funding priorities on total participation numbers.</td>
</tr>
<tr>
<td>College region</td>
<td>This constitutes a proxy for demographic and other environmental factors, which may explain changes in student numbers at a college.</td>
</tr>
<tr>
<td>College type (GFEC, SFC, other)</td>
<td>It is possible that some learners are easier to attract than others, depending on the type of course that the student is taking (vocational, academic, etc.); this variable helps control for this possibility by providing some indication of the mixes of courses offered by colleges.</td>
</tr>
<tr>
<td>Variable identifying whether college was involved in merger during between 1998 and 2006</td>
<td>Mergers could create economies or diseconomies of scale, which in turn could enhance or limit the potential for further expansion at a college; merger activity is potentially linked with the volume of capital expenditure.</td>
</tr>
</tbody>
</table>

*Source: Frontier Economics*

**Key regression results for overall participation numbers**

We find that capital expenditure has a positive impact on participation: for every additional £1 million spent, participation increased, on average, by 111 learners.

To put these numbers in the appropriate context, in 1998/99 an average college had approximately 9,000 learners. The average capital spend for colleges in our

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18 One difficulty we faced when calculating changes in college participation rates was how to deal with colleges that underwent mergers during the period of study. Given the large number of mergers that occurred during the period, we could not simply drop these colleges from the analysis. Instead, we opted to treat merged colleges as if they had always been single entities: initial participation figures for constituent colleges prior to a merger were added together to arrive at a ‘shadow’ initial participation figure for the merged college. Similarly, we took the weighted average of initial success rates for constituent colleges to generate a ‘shadow’ initial success rate for the merged college.

19 The full regression results are presented in Table 10 in Annex 2. This finding was statistically significant at the 1% level.
sample was £9.7 million between 1998/99 and 2006/07\textsuperscript{20}, implying that, on average, colleges attracted more than 1,000 additional learners over the course of this period by undertaking capital expenditure. This in turn suggests that the decline in total student numbers over the course of the period (due to changes in funding) would have been significantly greater in the absence of capital expenditure.

**Key regression results for different student subgroups**

So far, the analysis has focussed on the effects of capital expenditure on overall participation rates at a college. However, as noted above, we also had access to annual participation data for the following sub-categories:

- 16-18 year old learners;
- adult learners; and
- fulltime equivalent student numbers.

We, therefore, repeated the regression analysis for each of these three subgroups\textsuperscript{21}. The key results are summarised below:

- **Every additional £1m of capital expenditure between 1998/99 and 2006/07 led to an increase in the number of 16-18 year old learners by 46 individuals\textsuperscript{22}**. To put this finding in context, in 1998/99 the colleges in our sample had, on average, about 1,900 learners aged 16-18.

- The results also suggest that capital expenditure did much to reduce the overall decline in adult learners over the period. Specifically, we found that **every additional £1m of capital expenditure between 1998/99 and 2006/07 led to an increase in the number of adult learners by 65 individuals\textsuperscript{23}**. To put this finding in context, in 1998/99 the colleges in our sample had, on average, about 7,100 adult learners.

- It could be argued that simply looking at total student numbers may give a misleading impression of recent developments in participation by giving equal weight to learners enrolled on long/full-time and short/part-time courses. To circumvent this, we re-ran the regressions to analyse the effect of capital expenditure on so-called ‘full-time-equivalent’ learners. This alternative measure of participation weights learners by length of course. Re-running the regressions, we found that **every additional £1m of capital expenditure between 1998/99 and 2006/07 led to an increase in full-time-equivalent learner numbers of 66**. In other words, a **£1m project, on average, led to the equivalent of 66 more full-time learners arriving at the college\textsuperscript{24}**.

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\textsuperscript{20} All values are in 2008 terms

\textsuperscript{21} The full results are listed in columns 2 to 4 of Table 10 in Annex 2.

\textsuperscript{22} This result was significant at the 10\% level.

\textsuperscript{23} This result was significant at the 5\% level.

\textsuperscript{24} This result was significant at the 5\% level
provide some context, in 1998/99 the colleges in our sample had, on average, about 2,600 full-time-equivalent learners.

The key findings in relation to the effect of capital expenditure on participation numbers are summarised in Table 3 below.

<table>
<thead>
<tr>
<th>Learner subgroup</th>
<th>Average number of learners in 1998/99</th>
<th>Number of learners attracted by every additional £1 million of capital expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>All learners</td>
<td>9,000</td>
<td>111**</td>
</tr>
<tr>
<td>16-18 year olds</td>
<td>1,900</td>
<td>46*</td>
</tr>
<tr>
<td>Adult learners</td>
<td>7,100</td>
<td>65**</td>
</tr>
<tr>
<td>Full-time-equivalent learners</td>
<td>2,600</td>
<td>66**</td>
</tr>
</tbody>
</table>

Table 3: Key findings from participation regression analysis

** = significant at 5%
* = significant at 10%

Source: Frontier Economics

5.2 EFFECT OF CAPITAL EXPENDITURE ON SUCCESS

The second relationship we were interested in examining concerns the effect of capital expenditure on college learner success rates. To investigate this question, we studied the relationship between capital expenditure and the change in success rates at colleges in recent years. We had the following data at our disposal.

- Annual success rates for each college between 2000/01 and 2006/07. We used success, retention and achievement rates calculated by the LSC based on the ILR (see Chapter 4.2 for more details).
  - This information was used to calculate the change in success, retention and achievement rates between 2000/01 and 2006/07.
- Total real capital expenditure for each college since 1998/99. This variable was calculated and cleansed in exactly the same way as for the participation regression analysis (see Section 5.1.2).

5.2.1 Preliminary analysis for success rates

As discussed in Chapter 4.2, average success rates steadily increased from 59% in 2000/01 to 77% in 2006/07. We are interested in establishing whether any of this increase can be attributed to capital expenditure.

Again, it is useful to start by asking whether we can use this data to identify any correlation, this time between capital expenditure over the period and the change in success rates.
in the overall success rate between 2000/01 and 2006/07\textsuperscript{25}. The scatter plot in Figure 22 plots relationship between these variables.

Figure 22 provides some indication that a positive relationship exists between these variables. Again, however, a simple scatter plot does not control for other factors, which might explain a college’s change in success rates. It also provides no indication of whether capital expenditure might have a different effect on success rates for 16-18 year old learners and adult learners.

We need to undertake more sophisticated multiple regression analysis to establish whether capital expenditure really has helped increase success rates for different learner groups.

**Regression model specification**

The model specification used for the success rate regressions shared many similarities with the model specification used for the participation regressions. However, there were some notable differences. As well as including the control variables used in the participation regressions, the success rate regressions also incorporated a variable to identify colleges that undertook more than £50 million of capital expenditure between 1998/99 and 2006/07. This additional control variable is needed because the impact of capital expenditure on success rates is expected to be non-linear (because success rates cannot exceed 100\%)\textsuperscript{26}. For further information on the model specification used for the regression analysis, please refer to Annex 3.

\textsuperscript{25} Ideally, we would look at the change in the overall success rate between 1998 and 2006 so as to ensure consistency with the measure for total capital expenditure. However, as discussed in Chapter 4.2, we only had access to annual success rates dating back to 2000/01.

\textsuperscript{26} Currently, there are not enough observations in our sample with large (more than £50 million) capital expenditure projects in order to fully assess this non-linearity. However, that should become possible in the future when large ongoing capital projects are completed.
**Key success rate regression results for all learners**

We find that capital expenditure had a statistically significant positive impact on success rates. More specifically, **for every additional £10 million spent, the success rate increased by, on average, nearly 1 percentage point**\(^{27}\).

The analysis indicates that two other variables also had a statistically significant effect on the change in the success rate over the period. The coefficient on the variable identifying colleges with capital expenditure greater than £50m is negative and significant. This supports the hypothesis that the relationship between capital expenditure and success may be non-linear over very large ranges of capital expenditure. We should therefore be cautious about generalising the results reported here to colleges that undertake very high levels of capital expenditure.

**Key success rate regression results for different learner subgroups**

So far, the analysis has focussed on the effects of capital expenditure on overall success rates at a college. However, we also had access to annual success rate data for 16-18 year old and adult learners.

We therefore repeated the regression analysis for each of these subgroups. The results indicated that expenditure had a statistically significant effect on the change in success rates for adult learners: **for every additional £10 million spent at colleges in this group, the success rate for adult learners increased by, on average, 1.6 percentage points.** However, capital expenditure did not have a clearly identifiable effect on the success rate of learners in the 16-18 age bracket. For a full summary of the regression results, please refer to Table 11 in Annex 3.

**Success rate regression results when the sample is split into initially more/less successful colleges**

While statistically significant, the overall regression results indicate the effect of capital expenditure on college success rates to be relatively modest. To build up a more detailed picture of what was driving this, we split the sample into colleges with success rates that were initially above average and colleges with success rates that were initially below average. We then re-ran the regressions for each of these sub-samples separately. The key findings are summarised in Figure 23.

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\(^{27}\) This finding is statistically significant at the 5% level. The full regression results are listed in the first column of Table 11 in Annex 3. This finding is statistically significant at the 5% level.
As Figure 23 illustrates, the evidence suggests that a college’s initial success rate had important implications for the effect of capital expenditure on the subsequent growth in that college’s success rate.

- Capital expenditure has a particularly strong effect on the change in success rate for colleges with success rates that are initially above average. Specifically, **for every additional £10 million spent at colleges in this group, the success rate increased by, on average, 2.1 percentage points**. There are a number of potential explanations for this finding. One possibility is that the most successful colleges might also be those that have the expertise and experience to carry out capital expenditure in an efficient and effective manner.

- By contrast, when the sample was restricted to colleges with success rates that were initially below average, the result was statistically insignificant: there was no clear evidence that capital expenditure increased success rates for colleges in this group as a whole.

- However, when the sample was further restricted to colleges with initial success rates that were **in the bottom 20%** of the sample, a statistically significant relationship re-emerged. To be specific, **for every additional £10 million spent at colleges in this group, the success rate increased by**,  

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28 This result was significant at the 5% level.
Regression analysis

... on average, 1.9 percentage points\(^{29}\). Therefore, capital expenditure is associated with an improvement in these colleges’ performance\(^{30}\).

To summarise, capital expenditure would seem to have a significant effect on the success rate for colleges with success rates that are either initially above average or initially very low. There is no evidence that capital expenditure has an impact on success rates for colleges with success rates that are initially only slightly below average.

Interestingly, these findings differ in some respects from those reported by Frontier in its previous analysis of the effect of capital expenditure on success rates. In particular, in the previous study capital expenditure was not found to have a significant effect on success rates for the sample as a whole. However, this difference does not necessarily imply that the two sets of results point to inconsistent conclusions.

- In the previous study, no effect was found for the sample as a whole. We suggested that a possible reason for this was that capital expenditure tended to be undertaken by colleges that were successful from the outset. Since successful colleges tended to find it harder to increase success rates further, this camouflaged the beneficial effect of capital expenditure on success rates.

- Re-running separate regressions for initially more successful and initially less successful colleges supported this theory: capital expenditure was found to have a positive effect on the change in success rates for colleges with success rates that were initially low.

- In the current study, by contrast, no correlation was found between capital expenditure and initial success rate. In fact, almost all colleges undertook at least some capital expenditure between 1998/99 and 2006/07. Because of this, there is no reason for the ‘camouflage effect’ highlighted in the previous study to continue to apply. This might explain why on this occasion a significant relationship between capital expenditure and the change in success was observed for the sample as a whole.

**Effect of capital expenditure on retention and achievement rates**

As was discussed in Chapter 4.2, the overall success rate is equivalent to the retention rate multiplied by the achievement rate. This presents us with an opportunity to investigate the channels through which capital expenditure leads to an increase in success. We therefore re-ran the regression analysis using first retention and then achievement rates in place of overall success.

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\(^{29}\) This result was significant at the 10% level. The full set of regression results are presented in Table 12 of Annex 3.

\(^{30}\) We recognise that underperforming colleges might also receive additional help in the form of ‘rescue packages’. There may be other changes taking place at the same time as capital expenditure, such as a new management team and a recovery plan. Our dataset is not detailed enough to allow us to disentangle the impacts of these simultaneous changes. However, we attempt to explore these issues in our qualitative analysis.
The results provide some indication that capital expenditure has increased the success rate primarily by persuading learners to stay on at their college to complete their courses. We found that for every additional £10 million spent, the retention rate increased by, on average, 0.6 percentage points. This finding was statistically significant at the 10% level and explains about two-thirds of the effect of capital expenditure on the overall change in success rates. Our case studies provide supporting evidence for the impact of capital expenditure on retention (see Chapter 6). The regression results for retention in turn suggest that the remaining one-third of the effect of capital expenditure on success rates is explained by the effect that capital expenditure has on achievement rates.

The key findings in relation to the effect of capital expenditure on success rates are summarised in Table 4 below.

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31 We also ran regressions to analyse the effect of capital expenditure on the change in retention rates for different student subgroups. We found that for every additional £10 million spent, the retention rate for adult learners increased by, on average, 1 percentage point. This result was statistically significant at the 5% level. The results did not indicate that capital expenditure had a significant effect on the retention rate for 16-18 year old learners. The full set of results is presented in Table 13 of Annex 3.

32 Indeed, the achievement rate regressions themselves directly suggest this, though the coefficient on capital expenditure was not statistically significant. The full set of results for the achievement rate analysis is presented in Table 14 of Annex 3.
### Table 4: Key findings from success regression analysis

<table>
<thead>
<tr>
<th>Learner subgroup</th>
<th>Average success rate for sample in 2000/01</th>
<th>Percentage point increase in success rate associated with every additional £10 million of capital expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success rate, whole sample</td>
<td>61%</td>
<td>0.9 **</td>
</tr>
<tr>
<td>Success rate, 16-18 year old students only</td>
<td>60%</td>
<td>0.4</td>
</tr>
<tr>
<td>Success rate, adult old students only</td>
<td>58%</td>
<td>1.6**</td>
</tr>
<tr>
<td>Success rate for initially successful colleges</td>
<td>69%</td>
<td>2.1 **</td>
</tr>
<tr>
<td>Success rate for initially least successful 20% of colleges</td>
<td>47%</td>
<td>1.9*</td>
</tr>
<tr>
<td>Retention rate, whole sample</td>
<td>80%</td>
<td>0.6*</td>
</tr>
<tr>
<td>Achievement rate, whole sample</td>
<td>76%</td>
<td>0.4</td>
</tr>
</tbody>
</table>

** = significant at 5%
*  = significant at 10%

Source: Frontier Economics

#### 5.3 EFFECT OF CAPITAL EXPENDITURE ON COLLEGES’ ABILITY TO GENERATE FEE INCOME

As a final part of the quantitative analysis, we also investigated the effect of capital expenditure on colleges’ ability to generate fee income. Fee income data was available from college accounts. However, as discussed in Chapter 0, the pilot survey responses indicated that the definition of this variable was not consistent across colleges and over time. To circumvent these inconsistencies, we focussed instead on each college’s dependency on LSC income, expressed as a percentage. This information was also available in college accounts and verified by colleges in their questionnaire survey responses.

The regression analysis analysed the effect of capital expenditure on the change in a college’s dependency on LSC income between 2000/01 and 2006/07. The model specification we used was the same as for the participation regressions. In this case, however, the results were not statistically significant: there was little evidence that capital expenditure had any effect on the subsequent change in
dependency on LSC income. This is perhaps not surprising given that average dependency on LSC income for our sample remained in the region of 75-80% throughout the study period.

5.4 SUMMARY

This chapter has set out the econometric analysis relating to the effects of capital expenditure on college participation and success rates in recent years. The key finding from this analysis is that there is strong evidence that capital expenditure has had a positive impact on both of these sets of outcomes. Specifically, the analysis has found the following.

- **Capital expenditure is associated with an increase in college participation**: for every additional £1 million spent, participation increases, on average, by 111 learners or 66 FTE learners. When the overall impact is disaggregated into the effect on 16-18 year olds and adult learners, we observe that every additional £1 million spent leads to:
  - an increase in the number of 16-18 year old learners by 46 individuals; and
  - an increase in the number of adult learners by 65 individuals.

  All these results are statistically significant.

- **Capital expenditure is associated with an increase in college success rates**: a typical £10 million project improves the success rate by nearly 1 percentage point. Our statistical analysis also provides some insights into what it is that drives this relationship between capital expenditure and the change in success rates.

  - Capital expenditure appears to increase success rates primarily by persuading learners to see their qualifications through to completion. We find that every additional £10 million of capital expenditure increases a college’s retention rate by 0.6 percentage points.
  
  - The effect of capital expenditure appears to be particularly strong for colleges with success rates that are initially above average. For these colleges each additional £10 million of capital expenditure increases the success rate by more than 2 percentage points.
  
  - Capital expenditure also seems to have a significant effect on the success rate for colleges with success rates that are initially very low. More specifically, for colleges with initial success rates in the bottom 20% of the sample we found that for every additional £10 million of capital expenditure the success rate increases by nearly 2 percentage points. No statistically significant relationship was found for colleges with success rates that are only slightly below average.
6 Qualitative analysis

This chapter sets out the key findings of our qualitative study into the impact of capital expenditure on educational outcomes. The chapter is structured as follows:

- how the qualitative study was designed and carried out; and
- the key findings and recommendations identified by the qualitative study.

6.1 DESIGN OF THE QUALITATIVE STUDY

6.1.1 Framework

As discussed in the previous chapters, our quantitative analysis establishes empirical relationships between the amount of capital expenditure and educational outcomes, such as participation and success, across all colleges. However, this type of analysis is limited in its ability to assess individual capital expenditure projects and identify why some projects are more successful than other projects of similar size.

The purpose of our qualitative work is to capture some of the rich detail relating to the capital expenditure projects of individual colleges and to understand in more detail what makes individual projects successful. Our qualitative study also allowed us to discuss the impact of capital expenditure on other aspects of college performance (such as employer engagement and sustainability) which could not be fully explored in our quantitative analysis.

The framework for our discussions with colleges followed the approach in the Treasury Green Book for the appraisal and evaluation of public sector projects. This approach is also advocated by the LSC Capital Handbook which states that:

“Providers are reminded of the requirement whereby applications for capital project grant support for FE capital, 16-19 capital and Personal and Community Development Learning (PCDL) capital must be accompanied by an investment appraisal(s) in accordance with the manual published by HM Treasury called The Green Book: Appraisal and Evaluation in Central Government.”

33 LSC Capital Handbook, November 2006, page 5
Following this broad framework, we asked each college we visited to comment on five particular areas:

- **Rationale** – What was the rationale which first drove the college to implement a capital expenditure project?
- **Objectives** – What specific objectives did the college have for the capital expenditure project? How can these objectives be measured?
- **Appraisal and project planning** – How did the college appraise the options and plan the project to achieve these objectives?
- **Monitoring and implementation** – What were the important points that enabled the college to successfully deliver the project?
- **Evaluation** – How did the project perform against the objectives? Were there any other unanticipated benefits of the project?

In the following sections, we discuss these steps in more detail and provide recommendations for how the process can be improved in future, focusing in particular on the rationale, objectives, appraisal and evaluation stages.

### 6.1.2 The main study

We piloted our study in late March and early April 2008 with Ealing, Hammersmith and West London College. The pilot study explored different ways of gathering the information we required from colleges. In particular, it helped identify key individuals within the college that we should speak to. The pilot also showed that the best way to structure the interviews was via semi-structured meetings with individual college staff.

In total, we visited 14 further education colleges in England (including the pilot study). We feel that this was sufficient to get a good understanding of the key issues involved in planning and implementing a major capital expenditure project.
Colleges were selected based on a number of criteria and are broadly representative of:

- the range of different capital expenditure projects that are undertaken;
- the range of circumstances colleges operate in; and
- the different stages of a capital expenditure project.

Table 5 overleaf describes some characteristics of the 14 colleges we visited. We spent between half a day and a day at each college, typically meeting with three or four senior individuals for an hour each. We chose to speak to members of staff individually (or sometimes in small groups) in order to gather more information about their experiences with the project.

Key individuals within each college that we aimed to speak to included one or more of the following: College Principal; Deputy Principal or Project Sponsor; Estates Director; Finance Director or Curriculum Director.

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34 We have used current learner numbers to group colleges by size, using thresholds of 7,500 and 15,000 annual learners to define mid-sized and large colleges respectively. Similarly, we have used thresholds of £20m and £40m to group colleges according to their total capital expenditure from 1998-2006.
### Table 5: Characteristics of case study colleges

<table>
<thead>
<tr>
<th>College</th>
<th>Region</th>
<th>College size (based on learner numbers 2006-07)</th>
<th>Total Capex (1998-2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ealing, Hammersmith and West London College</td>
<td>London</td>
<td>Large</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Derby College</td>
<td>East Midlands</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>York College</td>
<td>Yorkshire and the Humber</td>
<td>Mid-sized</td>
<td>Large</td>
</tr>
<tr>
<td>New College Durham</td>
<td>North East</td>
<td>Mid-sized</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Stroud College</td>
<td>South West</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td>Matthew Boulton College of Further and Higher Education</td>
<td>West Midlands</td>
<td>Mid-sized</td>
<td>Large</td>
</tr>
<tr>
<td>Epping Forest College</td>
<td>East of England</td>
<td>Small</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Warwickshire College</td>
<td>West Midlands</td>
<td>Large</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Sheffield College</td>
<td>Yorkshire and the Humber</td>
<td>Large</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Aylesbury College</td>
<td>South East</td>
<td>Small</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Telford College of Arts and Technology</td>
<td>West Midlands</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>Gloucestershire College of Arts and Technology</td>
<td>South West</td>
<td>Large</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>Stephenson College</td>
<td>East Midlands</td>
<td>Mid-sized</td>
<td>Mid-sized</td>
</tr>
<tr>
<td>South East Essex College of Arts and Technology</td>
<td>East of England</td>
<td>Mid-sized</td>
<td>Large</td>
</tr>
</tbody>
</table>

6.2 THE RATIONALE

6.2.1 A case for intervention

The rationale should set out clearly the case for intervention against a situation which simply maintains the status quo. The process, therefore, compares a scenario where the college invests in new buildings with a ‘do nothing’ scenario.
To develop a clear understanding of what would happen if no action was taken, the college needs to consider current trends in all areas of college performance. The college should also consider whether these trends are likely to persist or may change in the future. To do this, it is important that colleges take into account wider factors which impact on college performance. These wider factors may include the demographics in the surrounding area, local labour market conditions or changes in competition from surrounding colleges (for example, the opening of a new building at a nearby college).

The task for colleges should be to identify problems with the existing provision which, if left unchecked, would prevent them from achieving the high level objectives of the colleges. Capital expenditure can therefore be justified if solving these problems removes this barrier to improvement. Alternatively, capital expenditure may allow the college to take advantage of an opportunity to improve an element of its performance that it could not do in the existing buildings.

### 6.2.2 Key findings

In general, we find that colleges do set out a clear rationale for investing in new buildings. This rationale tended to be linked more closely to an identified problem that the college needed to overcome than an opportunity that the college had identified. Put simply, in many cases ‘do nothing’ was not a viable option.

The main problem identified by colleges was the quality of the existing college estate. Substantial underinvestment in college buildings left them either unfit for purpose or unable to meet regulatory requirements. We found changes in delivery style and cultural change within the college to be secondary rationales for a capital project. In many cases, solving the more fundamental problem provided the opportunity for the college to implement other strategic changes at the same time.

Table 6 lists the factors that drove colleges to pursue a major capital expenditure project, grouped according to two main drivers: overcoming a problem and creating opportunities. The remainder of this section discusses the evidence in these areas in more detail.
Table 6: Rationale

<table>
<thead>
<tr>
<th>Driver</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcoming a problem</td>
<td>Underinvestment in existing buildings</td>
</tr>
<tr>
<td></td>
<td>Poor quality provision</td>
</tr>
<tr>
<td></td>
<td>Increased competition from rivals</td>
</tr>
<tr>
<td></td>
<td>Poor college reputation</td>
</tr>
<tr>
<td></td>
<td>Student dissatisfaction</td>
</tr>
<tr>
<td></td>
<td>Falling success rates</td>
</tr>
<tr>
<td></td>
<td>Declining or stagnating participation</td>
</tr>
<tr>
<td>Creating opportunities</td>
<td>Curriculum change</td>
</tr>
<tr>
<td></td>
<td>Cultural change</td>
</tr>
</tbody>
</table>

**Overcoming a problem**

(a) Building quality

Over half of colleges we visited told us that the current college estate was in severe disrepair, with buildings failing to meet regulatory requirements at the time. Table 7 overleaf describes the existing state of college buildings in more detail.

(b) Inspection reports

Several colleges we visited were criticised by an OFSTED inspection report prior to the start of their capital project. This signalled to the college that action was needed. It is important, however, to consider whether such action necessarily requires capital expenditure. This is particularly relevant as poor inspection reports can often be followed shortly afterwards by a change in management. This may be sufficient for addressing identified problems.

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35 At one college in the Midlands for example, an inspection report commented in particular on the need to improve buildings and estates. Another received the worst inspection report in the country at the time and was given a year to improve. A third was placed under special measures and a LSC representative put on the College Board.

36 One particularly stark example of managerial change was where a new Principal brought in a new Senior Management Team prior to the capital expenditure project. The senior management team were all committed to the following fundamental issues: moving back into full time 16-18
### Comment

Practically, there were severe structural issues with the existing site such that the college buildings were no longer fit for purpose. There was extensive backlog maintenance required in order to correct this.

The layout of the site did not make it easily accessible …. The site was difficult to wire for IT … Parts of the accommodation were considered unfit for human habitation with problems involving leakage, power and sewerage … The site did not have good disabled access, there were flat roofs which led to leakage and poor drainage in some areas.

A key driver behind the new build was that the old buildings were becoming too expensive to operate … Replacing four lifts in the old building would cost £2.3m and it would have cost around £200,000 per floor to remove the asbestos.

The existing provision was built in the 1950’s and 1960’s and was difficult to refurbish … High maintenance costs and poor accessibility (25% of the college was not accessible and required considerable effort to make accessible)

The economic imperative [for new buildings] came first. An independent survey on the existing college buildings revealed that they required £10m over 10 years just to stand still… The current site has out of date old buildings and requires significant investment to comply with legislation.

At present, despite some improvements, access for people who have disabilities is not consistently good across all parts of the college… the College’s buildings represent a real barrier to growth in all aspects of its education and training provision… for those who withdrew from the College during their programmes, inadequate heating and buildings-related disruption were included as reasons for leaving

A refurbishment plan was drawn up with an estimated cost of £5m. In general it was felt that the buildings were tired and the college needed impetus to spring out of its downward spiral.

The college had serious health and safety issues following years of underinvestment … In particular, the site was dilapidated and some areas of the site had been condemned … The buildings were in a state of decay, with leaking roofs, electrical failures, equipment and lifts that didn’t work and the threat of the building being condemned.

Table 7: Existing condition of college buildings
Qualitative analysis

(c) Reputation and other factors

More than one college we visited cited a vicious circle whereby low attainment and poor quality facilities contributed to the college’s poor reputation within a town. This in turn led to reduced participation and subsequent poorer matching
of learners to courses. This then affects success the following year and continues
the downward spiral of a college. The capital project was seen to offer a way to
break this pattern and can signal to the community (parents, learners and
employers) that the college is an attractive place to learn.\footnote{One large college we visited referred to research demonstrating a strong effect of a new purpose
built environment on the perceptions of local people.}

Colleges did appear to be aware of competing providers, demographic trends and
other changes in the local landscape, which influence college performance. However, only a few colleges we spoke to mentioned the direct impact of
competition from other providers seeking to rival their own facilities.\footnote{One mid-sized college noted that the opening of a new building at a neighbouring college could
slow or even halt the growth in participation that the college has seen since their own building
opened. Another college mentioned competition from nearby Academies, whilst another spoke of ‘defending your boundaries’.}

In another case, the new build could be seen as essential in order to rival the quality
of provision at a nearby college development. However, this was not the case
advanced by the Senior Management Team (SMT) to justify the new build.

\textbf{Creating opportunities}

For a small number of colleges, the rationale for the capital project did not
directly relate to an identified problem. Instead, the college identified certain
elements of college performance that could best be improved via a new build.

Curriculum change tended not to be the primary driver of a new build. The
evidence here was that most curriculum changes were evolutionary and simply
built upon the existing offer. A college with mid-sized capital expenditure in
particular told us that there was no dramatic change of curriculum that went
hand in hand with the capital expenditure project. Where curriculum change was
important, it was usually mentioned in line with developing a Centre of
Vocational Excellence, thereby meeting an identified skills gap in the local area
and improving employer engagement.

For some, the new building was an opportunity to change the style of teaching.
However, this was again not the primary rationale for a new build. The capital
expenditure project tended to be more symbolic than catalytic – these changes
could often have been implemented anyway without a capital expenditure
project.

At one Midlands college, a desire for cultural change provided a rationale for the
opening of a new centre. The building (not branded in the same way as the
existing college) split vocational and more academic provision at the college. A
new build also made it easier to introduce a different ethos, focussing more on
discipline within the college. Interestingly, another college in the south was also
able to develop a fresh brand for the new college, despite remaining on the same
site. This calls into question whether a new building is necessary to effect this
change.
6.2.3 Recommendations

The scale and the scope of the LSC’s capital expenditure programme are increasing. This is demonstrated by the substantial increase in total capital expenditure planned for 2009. In the future, as more and more colleges complete at least one large capital expenditure project, reference to poor quality existing buildings will be increasingly less applicable as a rationale for intervention.

Recommendation 1

- We recommend that in future colleges need to give more consideration to how investment in the college estate can bring other educational benefits besides simply ensuring compliance with existing regulations.

The LSC itself is tasked with balancing the increasing number of requests for capital expenditure projects against the finite amount of funds it has available. To ensure that capital funding is allocated in the most efficient way, colleges will need to advance a more comprehensive rationale demonstrating why their particular project should receive funding.

Recommendation 2

- Colleges need to give more thought to ways in which a capital expenditure project can help improve college performance in specific areas (e.g. improve attainment, employer engagement and sustainability).

6.3 OBJECTIVES

6.3.1 Objective setting

Having established a rationale for intervention, colleges should then consider the broad objectives that the project is designed to achieve. These should be closely aligned with the rationale for intervention. For example, if the rationale was that the quality of existing provision was poor, the overall objective for the college should be to address this area.

Within these broad objectives, colleges should then think about specific outcomes that are required in order to meet these objectives. In our example, one outcome could be a higher quality of teaching across the college. Where the outcomes cannot be measured directly, the next question is whether there are any intermediate outputs which contribute to these outcomes. Continuing with our example, the outputs in this case could be the results of student satisfaction surveys and OFSTED reports.

Finally, the college should set targets for projects. The Green Book advises that targets should be SMART;

- specific;
- measurable;
Specifically, in our example, a SMART target for a college could be to increase the percentage of classes that are rated as Grade 1 or Grade 2 by 5% by 2009-10.

More generally, the objectives set by colleges should not only be SMART but also bear close relation to policy. In particular, they should be linked to the four key LSC objectives of improving participation, attainment, sustainability and employer engagement.

### 6.3.2 Key findings

Colleges we visited tended not to express the objectives of the capital project as clearly defined, measurable targets. Although the high level objectives of colleges echo those of the LSC (participation, attainment, sustainability, and employer engagement), we found little evidence that targets in these areas had been carefully considered and quantified.

The only specific, measurable target set consistently across all colleges was for overall participation. This can be attributed to the LSC requirement that colleges justify forecast growth in student numbers as part of the application for funding.

In our discussions on the objectives of capital projects with the college, the focus tended to be on building design and the way the new college looked. Colleges found it difficult to link this to more specific objectives for the project in terms of participation, attainment, employer engagement or sustainability. Several colleges set out to make the college estate fit for purpose, make the college an attractive place for learners to learn or to make the college more visible to learners and employers. A drawback of these outcomes is that they are often difficult to quantify and, therefore, cannot easily be expressed as SMART targets.

The table below groups the objectives of colleges we visited into four main areas plus intermediate objectives, which can be linked to the main objectives.
## Table 8: Objectives

<table>
<thead>
<tr>
<th>Area</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>Increasing participation (either overall or for a specific group of learners)</td>
</tr>
<tr>
<td>Attainment</td>
<td>Increasing attainment (either overall or for a specific group of learners)</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Support sustainability and encourage innovation in sustainable design</td>
</tr>
<tr>
<td>Employer engagement</td>
<td>Improving employer engagement</td>
</tr>
<tr>
<td>Intermediate objectives</td>
<td>Expanding the range of provision (participation)</td>
</tr>
<tr>
<td></td>
<td>Improving the quality of provision (attainment, participation)</td>
</tr>
<tr>
<td></td>
<td>Improving student behaviour and security (participation, attainment, sustainability)</td>
</tr>
<tr>
<td></td>
<td>Improving space utilisation (sustainability)</td>
</tr>
<tr>
<td></td>
<td>Increasing the visibility of the college in the community (participation, employer engagement)</td>
</tr>
<tr>
<td></td>
<td>Improving financial viability (sustainability, employer engagement)</td>
</tr>
<tr>
<td></td>
<td>Making the college fit for purpose (participation)</td>
</tr>
</tbody>
</table>
Participation

Good practice in objective setting

One college in the south of England in particular demonstrated good practice in objective setting. The college was aware of the need to carry out a post-project review and identified particular outputs of the project to help with this exercise. These outputs and how they are to be measured are set out in Table 9 below.

<table>
<thead>
<tr>
<th>Target</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase participation in learning</td>
<td>Change in the number of learners recruited</td>
</tr>
<tr>
<td>Increase range of provision</td>
<td>Change in the number of curriculum areas</td>
</tr>
<tr>
<td>Increase engagement with employers</td>
<td>Change in the number of learners from employers</td>
</tr>
<tr>
<td>Improve learner satisfaction</td>
<td>Change in learner retention % and learner satisfaction results</td>
</tr>
<tr>
<td>Improve quality and raise standards</td>
<td>Change in learner achievement %</td>
</tr>
<tr>
<td>Improve staff morale</td>
<td>Change in staff retention and staff satisfaction results</td>
</tr>
<tr>
<td>Improve financial health</td>
<td>Change in financial health rating</td>
</tr>
</tbody>
</table>

Table 9: An example of good practice in setting objectives

We have identified this college as an example of good practice when setting objectives and identifying outputs. However, the college still does not go as far as to set specific, measurable, time-bound performance targets other than for participation. This means that the college would still be unable to comprehensively evaluate the project in other areas such as attainment by comparing actual performance against SMART targets.

LSC guidance in the Capital Handbook requires colleges to submit forecast on-site guided learning hours for the next five years. These have the advantage that they are easily measured and performance against these targets can be monitored over time. A good example of how to specify participation targets was given by a large college that set ‘prudent but challenging’ growth targets, split by groups of learners and based soundly on changing local demographics. The same college also identified a large proportion of young people who were NEET in the local area and thought that the new college would help to engage with this group.

We note that colleges are not however required to rigorously justify participation forecasts in the application. One college we visited indicated that participation forecasts in the application document are simply a tool to secure funding, rather than an accurate projection of participation growth.
Colleges did identify several intermediate outcomes which contribute to increased participation. One such outcome is improved accessibility, measured by the time it takes for learners to travel to the college. Although only one large college expressly linked this to participation, other colleges also cited better transport links as a desirable outcome of the capital project. Increasing ‘brand’ awareness and the visibility of the college in the community was seen as a way to increase participation. However, in the absence of any specific targets it is unclear what colleges wanted to achieve in this area.

Section 6.6.2 evaluates the evidence on the impact of capital expenditure projects on participation.

**Learner success rates**

A large college, currently boasting success rates above 90%, stated that an objective for the forthcoming capital expenditure project was to maintain success at these levels. This was one of the few examples we found where success rates themselves were specifically targeted as an objective for the capital project.

At two mid-sized colleges, the new build was seen as an opportunity to improve the overall quality of provision (as rated by OFSTED) from ‘good’ or ‘very good’ to ‘outstanding’. The new building was seen by the college as a way to achieve this. These are again two of the few examples where colleges identified a relevant quantifiable objective in terms of attainment.

Some examples of intermediate outcomes highlighted by colleges contributing to improved attainment include:

- better retention of learners;
- better matching of learners to courses;
- improved morale of teaching staff;
- better quality of teaching; and
- more access to appropriate learning resources.

However, colleges appeared not to have given sufficient thought to how to specify and measure these intermediate targets.

Section 6.6.2 evaluates the evidence on the impact of capital expenditure projects on attainment.

**Employer engagement**

Improving employer engagement did not appear to be a key priority for colleges embarking on a capital expenditure project. When we mentioned employer engagement to colleges, almost all noted that they thought this had improved in the past.
the new building. However, the evidence from colleges suggested that most benefits were unplanned and colleges had not expressly considered what they wanted to achieve in this area.

Here, the intermediate outcomes mentioned by colleges which contributed to employer engagement were:

- a more professional looking environment;
- a striking and visible building; and
- space within the college that could be used by employers.

There were some exceptions: one Midlands college was particularly aware of opportunities to improve employer engagement via a new build. The senior staff talked of the main mission of the new college to provide skills for industry.

Section 6.6.2 evaluates the evidence on the impact of capital expenditure projects on employer engagement.

**Sustainability**

Improving sustainability was not highlighted by any college as the primary objective for the capital expenditure project. This was either because at the time of the new build, sustainability was not high on the LSC agenda or was considered too costly.

Many colleges informed us that for sustainability to become a key objective for a new build, they require additional funding from the LSC. Where feasible, sustainability initiatives have been reflected in the design of the building, although such measures tend to originate from the architect rather than from the college.

Section 6.6.2 evaluates the evidence on the impact of capital expenditure projects on sustainability.

6.3.3 Recommendations

**Recommendation 3**

- We recommend that colleges place more emphasis on refining their objectives into SMART targets.

- This is particularly important for objectives which relate to attainment, employer engagement and sustainability as these tend to be less well specified.

Setting SMART objectives would help not only when planning projects and appraising the different options available, but also when carrying out a post-project review and evaluating performance once the project has been completed.

Participation targets could be improved if they were more rigorously justified in the application. In particular, colleges could link growth more specifically to the likely impact of capital expenditure on participation across different curriculum
areas or groups of learners. Ideally, this should also reflect changes in local demographics and skills needs.

Some colleges did consider the effect of a new building on participation in different areas. This was often linked to meeting an identified skills need in the local economy or developing a Centre of Vocational Excellence. Whilst we do not recommend that colleges set participation targets for each individual course, we would encourage colleges to set specific targets in those areas where they would like to achieve the main impact.

**Recommendation 4**

- Objectives for attainment could be developed to a greater extent. We would recommend refining current objectives into more specific targets, either relating to overall success rates (retention rates, achievement rates), or to intermediate variables which are linked to success (future inspection reports, teaching quality assessments, staff and student satisfaction surveys etc.).

- Finally, if colleges set SMART objectives for employer engagement at the start of the project, this would increase the focus of senior management on this area. We would expect the effect of capital expenditure on employer engagement to be larger as a result.

### 6.4 APPRAISAL AND PROJECT PLANNING

#### 6.4.1 Appraising a project

The purpose of the appraisal process is to ensure that the chosen project represents the most cost-effective way to achieve the identified objectives of the college. Any project which relies in full or in part on capital funding from the LSC should go through this process.

The appraisal process should begin by identifying the range of options that the college could take in order to achieve their objectives. These options could include:

- updating the existing college estate to a minimum standard (a ‘do minimum’ option);
- rebuilding the college on the same site; and
- moving to a different site.

We would expect colleges to seek external advice on the feasibility and cost of building in each location. The LSC Regional Property Advisor, local council, planning authority, architect and quantity surveyor may be useful during this process.

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40 This location could be in the same area as the existing college or in an entirely different area of the town.
Having developed and refined a set of options, the next step is to decide on the most attractive proposal. A good project appraisal uses SMART objectives as criteria against which to compare projects. The chosen proposal should be the one that best meets the objectives of the college whilst still ensuring value for money.

When planning the project, there are several practical issues for the college to consider, ranging from how to finance the project, how to design the building and what to put in it! Visiting other examples of best practice within the further education sector will help colleges to make these decisions.

6.4.2 Key findings

Most colleges we visited identified a ‘do minimum’ option which modernised the college estate in line with regulatory requirements. This was seen as costly relative to the benefits that such an investment would bring. Colleges therefore preferred to opt for a larger scale, more radical overhaul of the college estate.

Colleges did consider how the location of the new college building could help achieve their objectives. A good example of this used research undertaken by an external agency and a Strategic Area Review to determine the most attractive site. Good transport links are a key factor in this. With this in mind, one college told us that their starting point for each phase of their capital project was to carry out a transport assessment to identify the optimal location. More generally, choosing a prominent central site was thought to raise awareness of the college within the local community, thereby boosting participation and employer engagement with the college.

Prior to the Application in Principle (AiP), colleges did engage with local authorities and property advisors to secure possession of land and assess the feasibility of building on a particular site. This process was particularly important for city centre developments and in areas where planning permission for a new development may have proved difficult to obtain. During the feasibility stage only one college talked of involving local business leaders to help evaluate the effect on employers of the options that were available.

Finally, colleges tended to visit several other colleges with recent experience of a large capital project prior to their own build. The main benefit of this was to help develop design ideas for the building, an area where a senior management team that has not carried out a project before lacks experience.

Annex 5 to this chapter discusses in more detail the choices that colleges face when planning a capital project, particularly in relation to the practicalities of building design and financing the project.

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The current LSC capital forms require colleges to appraise a preferred option, next best option and base case scenario according to the net present value (NPV) generated by each.
6.4.3 Recommendations

In practice, projects are appraised solely in terms of their net present value (NPV). We note that colleges were not able to use SMART objectives to compare the available options as these tended not to be clearly articulated (see previous section).

**Recommendation 5**

- Whilst we do not recommend that colleges undertake a comprehensive cost benefit analysis of every option, we would encourage colleges to consider the merits of each option with reference to objectives other than the NPV.
- The appraisal process could be improved, were colleges to compare the cost with the ability of each option to achieve the objectives set out at the start of the project.

Finally, colleges found it useful to visit other colleges with experience of a capital project prior to their own build. Whilst we note that this is important for colleges to get a good idea of best practice within the sector, this process needs to be carefully managed. The large number of visits that take place can prove a burden for the Senior Management Team at the host college. One potential solution is that tours of the new build take place at set times throughout the year, allowing other colleges to visit in groups rather than individually.

**Recommendation 6**

- There is clearly a need for a knowledge bank within the system to minimise the number of visits to any one individual college when appraising the options for a capital expenditure project.

6.5 PROJECT IMPLEMENTATION AND MONITORING

Numerous books have been written on effective project management so we do not intend to cover these areas in great detail. In this section, we focus on particular issues associated with managing a capital build in a further education college.

During the implementation phase, the aim for a college should be to ensure that the process runs smoothly. In practice this involves making well informed decisions when procuring and managing external contractors such that the project is delivered on time and on budget.

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42 Many colleges complained that the number of visits by other colleges to the completed project was large. In fact, two colleges we visited are now charging other colleges to look round! We would however expect the number of visits to any one individual college to reduce in the future as the number of colleges that have completed projects increases.
6.5.1 Key findings

When choosing external contractors, the most successful projects appeared to be those where the contractors understood the educational requirements of the college. Problems arose when the college did not effectively communicate to the professional teams working on the project the need to minimise disruptions to learners.

Ensuring that the project remained on time was helped by appointing an individual whose sole responsibility was to manage the project. This helped establish a clear and effective channel of communication between curriculum staff, the Senior Management team, Governors and external contractors. Similarly, setting out a clearly defined decision making structure within the college helped minimise the risk of delays.

The majority of colleges we visited adopted a “design and build” contract, which effectively guaranteed that the project was delivered on or below budget. The nature of the contract meant building design was inflexible and that changes to the initial design were costly. This was highlighted as a problem by more than one college.

Annex 5 to this chapter provides further discussion on particular issues that arise during the implementation of a capital project.

6.5.2 Recommendations

We encourage colleges to continue existing good practice by developing clear channels of communication between the lead individual within the senior management team of the college and the external project team. Close monitoring of progress, particularly in relation to the impact that the building has on existing learners would help to manage disruption during the build period and ensure that the college meets the objectives of learners once completed.

Finally, for colleges subject to a design and build contract, we recommend that more time is spent developing plans in the design stage. This should help minimise the number of costly changes that need to be made during construction.

6.6 EVALUATION

6.6.1 The evaluation process

The evaluation process records post-project outcomes and compares performance against targets set at the start of the project. To understand the impact of capital expenditure on performance, it is important to consider a counterfactual where the project had not taken place at all. This way, it would be possible to separate the effect of capital expenditure from other changes taking place in the college at the time.

The results of a good evaluation would include a discussion of:

- whether the project met the objectives;
Qualitative analysis

• whether there were any unanticipated benefits from the project;
• whether the same results could have been achieved at a lower cost; and
• how the experience with the project will help the management in the future.

The direct benefit of a post-project review for an individual college is to highlight areas to improve for projects with multiple phases. However, we are aware that many projects will only consist of a single phase and the Senior Management Team at the college is unlikely to implement another capital project in the near future. The direct benefits of a post project evaluation to colleges may therefore be limited.

Given that individual colleges may not have strong incentives to carry out a thorough evaluation of capital expenditure projects, the LSC might need to play a more active role and to encourage colleges to do so. It will help the LSC to create a “knowledge bank” within the further education system and inform its decision on the types of projects to be funded in the future.

Furthermore, colleges will be able to draw upon the knowledge bank and “borrow” elements of projects in other colleges that have been particularly successful. As discussed in section 6.4.3, this should also lead to reduced visits by other colleges to the completed building (thereby reducing management time spent conducting tours and time spent visiting other colleges for future projects).

6.6.2 Key findings

Only one college we visited supplied us with a post-project review. This limits our ability to comprehensively evaluate the outcomes of the project once it has been completed. Furthermore, in the absence of clearly defined, measurable objectives, we cannot judge whether performance has been in line with expectations. Finally, without reference to a counterfactual ‘do nothing’ option, we can only report overall outcomes of the project rather than isolate the incremental impact of the capital project alone.

Below, we report project outcomes which relate to the four key LSC objectives of participation, attainment, employer engagement and sustainability in more detail.

Participation

Capital expenditure projects do appear to contribute to increased participation. This is supported by evidence that participation growth is typically in excess of LSC forecasts. The result is that over half of all colleges we visited are now short of space and are either renting premises, planning an extension or adding an additional building to meet demand43.

43 At one Midlands college for example, the college retained an option on surrounding land, which they have now exercised to accommodate growth in participation. At three further colleges, participation growth has led to a short-term need to hire nearby buildings, which may prove costly in the longer term. Similarly another small college made no plans for future expansion, although this
We have already noted that the LSC requires colleges to submit participation forecasts as part of the application for funding. We also know that colleges can and do systematically record and monitor participation over time. The result is that the senior management team focuses in particular on participation as an objective, perhaps explaining why growth in participation has taken place following a new build.

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was partly driven by the requirement to sell college land to maintain borrowing at an acceptable level.
Qualitative analysis

Changes in student mix

One city centre college provided an interesting example of how the student mix changed following a new build. The college moved from having 80% adult learners to 50%. The Principal attributed this change in part to the more central location which encouraged the 16-18 groups, but made it difficult for adults to park. This shift also needs to be considered in relation to the steady decline in the number of 19+ learners shifting focus towards the younger age group.

More generally, in our discussions with colleges, it was hard to determine where observed increases in participation were coming from. There was no evidence advanced to us that learners were being displaced from surrounding 6th forms. Furthermore, evidence on the impact of the new building on learners that are NEET is mixed. Some colleges we visited thought that the new building encouraged NEETs; another thought that a more professional environment may actually discourage this group from enrolling at the college.

We were told frequently that a new build had a positive impact on student behaviour by fostering greater respect for their surroundings. The evidence in this area is through reduced incidents of vandalism, an outcome mentioned by more than one college. Learners now feel more secure when studying at the college. This helps colleges to attract learners to the college in the first place (participation), retain learners (attainment) and reduce maintenance costs.

Learner success rates

Success rates tend to improve following the opening of a new build. The one post-project review we saw said that retention rates and achievement rates had both increased over a relatively short period of time. Evidence from other case studies suggested that improvements in success are more likely to be linked to retention rather than achievement. This finding is consistent with the results of our quantitative analysis.

The evidence for the impact of capital expenditure on retention is that several colleges report that they now have more trouble getting learners to leave the college after classes have finished rather than encouraging them to attend. An attractive refectory and comfortable, well-equipped learning and resource centre were seen as major factors in this.

Evidence on the impact of capital expenditure on achievement is mixed. Where current achievement rates are high, capital expenditure appeared unlikely to further increase achievement, rather to prevent it from declining. Some colleges however thought achievement had improved following the capital expenditure project. We pushed colleges on whether this was down to better matching of learners to courses or whether this was a result of the college being more

44 The success rate is equal to the retention rate (the number of qualifications completed as a percentage of the number of qualifications started) multiplied by the achievement rate (the number of qualifications achieved as a percentage of the number of qualifications completed).
selective. For one college which received a large amount of capital expenditure, the latter effect appears to dominate as qualification requirements have increased following the new build.

An alternative explanation for the impact of capital expenditure on attainment is that the new environment creates a more motivated workforce and makes it easier to recruit and retain qualified staff. One post-project review identified low staff turnover and high staff satisfaction as outcomes of the project. There is little evidence however that changed teaching practices (particularly in relation to moves to open learning) have had a significant effect on success rates.

**Employer engagement**

The main message coming from our discussions with colleges was that the new building signalled to local employers that the college was a success. This therefore encouraged employers to engage more with the college.

In spite of this assertion, colleges we visited provided limited evidence that employer engagement had increased as a result of the new build. We attribute this to a lack of measurable targets in this area. At one city college, employers were only encouraged in particular curriculum areas. At another southern college, the Senior Management Team has found it difficult to improve employer engagement as the local area is characterised by a number of small enterprises.

One perhaps unanticipated benefit for colleges was that local employers now use the facilities at the college to hold meetings and conferences. This is not only a direct source of revenue but also raises the profile of the college in the town. One large college regretted that they had not specifically factored in such a space when designing the building.

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45 Some colleges noticed improved communication between staff members following the new build. This may be a result of the introduction of open plan staff rooms, the adoption of new working practices, or simply an effect of working in a more pleasant environment.

46 A large college provided a good example of how a new building changed the style of teaching. The new build introduced more resource based learning, replacing more didactic teaching methods. Combined with this, the college introduced some shared classroom space, encouraging staff to share ideas with colleagues. The approach at another mid-sized college was similar, although proved to be much less successful.
**Promoting employer engagement**

Capital expenditure did have a significant effect on employer engagement at one large college. The building aimed to be highly professional and highly commercial, thereby allowing the college to build upon their existing strengths in terms of employer engagement. The result was that they entered into deals whereby a number of leading engineering firms in the local area provided equipment worth over £2m for the centre.

**Sustainability**

Improvements in sustainability have been small in scale. The only sustainable measures implemented by colleges tended to be inexpensive to install. These include the use of low energy lighting, automatic light sensors, lean burn boilers, and recycled (“grey”) water. Other measures were considered too costly and could only be implemented if the college received additional funding.

One sustainability initiative we encountered frequently was the use of naturally ventilated buildings. In general, this has not proved successful and has often resulted in temporary air conditioning being retrofitted in the college. However, one college noted a negative effect on attainment from placing learners and staff in hot and uncomfortable environments as well as a positive effect on improved sustainability and lower cost.

Figure 26: Ventilation problems

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47 For example, a college which received mid-sized capital investment over the period did not initially receive a grant for photovoltaic cells. These are now being installed this summer.
6.6.3 Recommendations

At present, there appears to be no link between objectives articulated in the application for funding and the outcomes of a project, other than for overall participation.

**Recommendation 7**
- There is a need to evaluate project outcomes with reference to SMART performance targets.

The evidence from both our quantitative and qualitative studies demonstrates a positive relationship between capital expenditure and increased participation. During the planning process however, many colleges feel they have little influence over the amount of space they are allocated in the new build as this is determined by LSC space guidelines.

**Recommendation 8**
- To the extent that colleges expect participation growth to exceed the space available in the new building, an important lesson for colleges is to consider their strategy if forecast student numbers are exceeded.
- This is especially important in city centre developments where there is a lack of available land on which to build an extension.

Finally, when evaluating the impact of a project, colleges need to be aware that meeting objectives in one area (e.g. improving attainment) can be at the expense of objectives in another (e.g. widening participation amongst learners who are currently NEET). Setting out objectives at the start of the project will help colleges to balance trade-offs such as this. Furthermore we would encourage colleges to consider the incremental effect of capital expenditure rather than simply noting outcomes, particularly if there has been substantial change in competition or demographics in the local area between the application and the time of project evaluation.
7 Conclusion

The Learning and Skills Council (LSC) provides grant support for FE colleges’ capital projects and is interested in assessing the impact this capital expenditure has on colleges’ performance.

In the past, Frontier Economics carried out two evaluation studies estimating the impact of capital expenditure grants on college outcomes, including participation and attainment. These studies were based on the existing data sources\(^{48}\) and did not involve any primary data collection.

In 2007, the LSC commissioned Frontier Economics to undertake a further study. This new study builds on our previous work, but also expands and develops it in a number of ways.

7.1 QUANTITATIVE ANALYSIS

The general approach to the quantitative study is similar to the one we used in our previous research, i.e. we use econometric techniques to estimate the effect of capital investment on the \textit{change} in performance of colleges over time (before and after capital investment), while at the same time taking into account differences in other college characteristics that might have an impact on the observed outcomes.

Our econometric analysis is based on the sample of 180 colleges that completed and returned our data template. This represents 53\% of all colleges undertaking capital expenditure in the last decade. The sample is representative of the population of colleges as a whole, based on colleges’ observable characteristics (size, location, trends in participation and attainment).

7.1.1 The impact of capital investment on participation

Overall, we find that capital expenditure has a significant positive impact on participation. Our regression analysis – which takes into account differences in college characteristics (type, size, region, proportion of adult learners) - shows that \textbf{for every additional \£1 million spent, participation increases, on average, by 111 learners or 66 FTEs.}

When the overall impact is disaggregated into the effect on 16-18 year olds and adult learners, we observe that every additional \£1 million spent leads to:

- an increase in the number of 16-18 year old learners by 46 individuals; and
- an increase in the number of adult learners by 65 individuals\(^{49}\).

\(^{48}\) The Individual Learner Record data (ILR) and the LSC capital investment application database.

\(^{49}\) These results are statistically significant.
Conclusion

To put these numbers in the right context: in 2006/07, an average college had 2,200 16-18 year old learners (mainly full-time learners) and 5,700 adult learners (mainly part-time learners).

The impact on adult learners is particularly worth emphasising. As Figure 27 demonstrates, the numbers of adult learners have been in decline in the last three years (due to a reduction in the LSC funding available for adult learners). While the overall trend is negative, our analysis indicates that capital investment, to some extent, counteracts this negative trend, i.e. colleges that spend more on improving the quality of their estate are attracting more (or losing fewer) adult learners compared to colleges that spend less.

![Figure 27: Total number of adult learners by academic year](source: ILR)

### 7.1.2 The impact of capital investment on success rates

We use college success rates, calculated by the LSC, as the main measure of attainment. These success rates, defined as the number of qualifications achieved as a percentage of the number started, are based on the Individual Learner Record data (ILR) and are used by the LSC as part of their Performance Review and by OFSTED during inspections. This measure is equivalent to the retention rate\(^{50}\) multiplied by the achievement rate\(^{51}\).

For the colleges in our sample, average success rates exhibited a steady increase from 59% in 2000/01\(^{52}\) to 77% in 2006/07 (Figure 28).

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50 The retention rate is defined as the number of qualifications completed as a percentage of the number started.

51 The achievement rate is defined as the number of qualifications achieved as a percentage of the number completed.

52 Please note that these measures are calculated by the LSC and are not available for 1998/99 and 1999/00.
As with participation, we estimate the impact of capital expenditure on the change in colleges’ success rates. We find that every additional £1 million of capital expenditure increases the college success rate by nearly 0.1 percentage points. To put it differently, a typical £10 million project improves the success rate by nearly 1 percentage point. This result is statistically significant and robust to changes in regression specification.

Our statistical analysis also provides some insights into what it is that drives this relationship between capital expenditure and the change in success rates.

- Capital expenditure appears to increase success rates primarily by persuading learners to see their qualifications through to completion. We find that every additional £10 million of capital expenditure increases a college’s retention rate by 0.6 percentage points. Again, this result is statistically significant and robust to changes in regression specification.

- The effect of capital expenditure appears to be particularly strong for colleges with success rates that are initially above average. For these colleges each additional £10 million of capital expenditure increases the success rate by more than 2 percentage points.

- Capital expenditure also seems to have a significant effect on the success rate for colleges with success rates that are initially very low. More specifically, for colleges with initial success rates in the bottom 20% of the sample we found that for every additional £10 million of capital expenditure the success rate increases by nearly 2 percentage points. No statistically significant relationship was found for colleges with success rates that are only slightly below average.

### 7.2 QUALITATIVE ANALYSIS

As part of the study into the impact of capital expenditure on educational outcomes, we have carried out a series of case study visits. In total, we visited 14 further education colleges that had recently undertaken a major capital expenditure project.
We assess these projects using the Treasury Green Book appraisal framework (illustrated by Figure 29). More specifically, we focus on each stage of the project evaluation (i.e. rationale, objectives, appraisal, etc.), assess the existing practices and make recommendations how these practices may be improved.

Figure 29: Evaluation cycle

Source: HM Treasury Green Book

**The rationale for a capital expenditure project**

In order to be effective, each capital project needs to have a sound rationale. Colleges need to be forward-looking and to identify what would happen in the next 5-10 years if they choose to ‘do nothing’. This scenario then needs to be compared with what would happen if they did invest in their estate.

Under both scenarios colleges need to assess potential implications for participation (in total and for individual groups), attainment and their ability to generate income and to engage with employers. Colleges may also be looking to achieve other objectives. When thinking through the implications in both cases, the colleges need to take into account demographic trends in the area, changes in the labour market, competition from neighbouring colleges, etc. This comparison should help colleges to determine whether they have a sound rationale for undertaking a capital investment project.

Our case studies demonstrate that all colleges go through this process. In many cases identifying the rationale was simple – the existing college estate was outdated or unable to meet regulatory requirements. Therefore, ‘do nothing’ was simply not an option. There were also other reasons for undertaking a capital build, e.g. rationalisation of the college estate following a merger or relocation to a more favourable location in the town.

We recommend that going forward colleges should maintain the good practice of identifying a sound rationale for their capital projects. We expect that in the future this stage would require more work, as reasoning along the lines “we will need to close down the college otherwise” would be less and less applicable.
**Setting objectives for a project**

This is a very important step. Without setting SMART\(^5\) objectives, it is virtually impossible to assess later whether the project is successful.

The majority of colleges we visited tended not to express the objectives of the capital expenditure project as clearly defined, measurable targets. The requirement by the LSC to include forecast student numbers in the application for funding meant colleges set targets for participation more often than targets for success and other performance indicators. For example, with some exceptions, increased employer engagement did not appear to be an objective at the start of the project and was identified more as a bonus once the project was completed.

We recommend that colleges focus more on this stage of project planning and evaluation process. We also believe that the LSC can play a more active role by encouraging colleges to articulate their objectives more clearly in their grant application forms.

**Appraising the options and planning a project**

The appraisal process involves identifying different options and choosing the one that allows the college to achieve its objectives in the most cost-effective way (i.e. represents the best value for money).

We found that colleges do consider a number of alternatives, focusing specifically on location, finance and building design. In particular, individuals we spoke to mentioned the importance of good transport links and benefits of locating more centrally within a town. When designing the building itself, the aim of colleges was to create a building which was flexible (in terms of how space was used), secure, visible to learners and employers.

We believe that options’ appraisal would be more straightforward if colleges set SMART objectives (see the previous stage). Consultations with local authorities, employers and wider community should also help identify the optimal option. While there are examples of this happening already, colleges are often too time-constrained to undertake detailed consultations.

Finally, sharing good practice within the sector should also be encouraged. When planning their capital build, colleges find it useful visiting other colleges, which have recently completed projects, in order to learn from their experience.

**Implementing and monitoring a project**

Our focus in this area was not on how to manage projects in general, but on particular issues which apply to further education colleges. It appears that the most critical issue at this stage is to ensure that the project is delivered on time because even a short delay may negatively affect enrolment. Our discussions indicated that a clearly defined decision making structure across the Governors,

\(^5\) SMART stands for specific, measurable, achievable, relevant and time-bound.
Principal and Senior Management Team of a college was important for the smooth running and timely delivery of a project.

Another potential issue during the implementation stage is minimising disruption for learners and staff. It appears that most colleges managed this well. Participation does not seem to have been adversely affected during the building phase. We found that keeping the staff and learners informed about the progress of building works contributed to this positive outcome.

**Evaluating project outcomes**

The next stage is the post-project evaluation, when colleges assess whether they have met their set objectives.

Typically, the colleges we visited had not carried out a comprehensive post-project review. The evidence presented on outcomes in terms of participation, attainment, employer engagement and sustainability, therefore, tended to be more qualitative in its nature.

- Most colleges believed that a new building has a positive impact on participation and in most cases could produce evidence of the impact. We attribute this to the fact that participation is the only objective where colleges were more likely to set specific targets and to evaluate their progress.

- Colleges described capital investment as having an impact on success rates primarily through increased retention rather than through achievement. This is consistent with our econometric analysis. We believe that colleges could have achieved better results, had they set more specific and measurable targets both for success.

- The principal effect of the new building on employers is to signal that the college is successful and, therefore, is a good business partner. However, colleges (with very few exceptions) provided little evidence to demonstrate whether their capital projects helped them to improve employer engagement.

- Finally, evidence on the contribution of new buildings to sustainability is mixed. Although some measures to improve sustainability have been introduced, this was not high on the agenda when these projects were built and such measures often proved too costly to implement.

Based on this qualitative analysis, our main recommendation to colleges, starting a capital expenditure project, would be to set explicit medium-term (5 to 8 years) targets for participation, success, retention and employer engagement, and to monitor progress towards these targets over time.
Annex 1: Comparing the sample to all colleges

Below we compare our sample to the full set of colleges. More specifically, we compare observable characteristics, such as participation, success, retention, dependency on LSC income and location for both 16-18 year olds and adult learners. This analysis is needed to ensure that our sample is broadly representative of the sector, so that we can infer results for all colleges from the results for the sample.

Participation

Figure 30 and Figure 31 below compare how average participation per college has changed over time for the sample and for all colleges. Note that the participation figures for the sample are very similar to those for the population as a whole at both the beginning of the period of study (1998/99) and the end (2006/07). Moreover, the overall trends in participation are also comparable: for 16-18 year olds (Figure 30) participation grew throughout the period; while for adult learners (Figure 31) participation increased between 1998/99 and 2002/03 and declined thereafter.

Figure 30: Average 16-18 participation by academic year for sample and population

Source: ILR data
Figure 32 and Figure 33 compare the distribution of changes in participation for the colleges in our sample with the distribution of changes in participation for the population as a whole. Again, it appears that the sample matches the population very closely. For 16-18 year olds (Figure 32), both show a peak in the frequency with a positive change of 0-250 learners; both have positive “tails”. For adult learners (Figure 33), both show a peak in the frequency with a negative change in participation between 0-2,000 learners; both have negative “tails”.

Barnsley College, which had a negative change of 55,000 learners, was not included in the All Colleges graph for display purposes.
Annex 1: Comparing the sample to all colleges

Figure 32: Distribution of colleges by change in 16-18 participation between academic years 1998/99 and 2006/07 for sample and population

Source: ILR data
Annex 1: Comparing the sample to all colleges

Figure 33: Distribution of colleges by change in adult learner participation between academic years 1998/99 and 2006/07 for sample and population.

Source: ILR data

Sample colleges

All colleges

Success rate

Figure 34 and Figure 35 below compare the average 16-18 year old and adult learner success rate per college for the sample against the whole population.

Figure 34: Average 16-18 success rates by academic year for sample and population.

Source: ILR data

Annex 1: Comparing the sample to all colleges
As can be seen from the bar graphs above, the success rates for the sample and the whole population match each other very closely for both 16-18 year olds and adult learners. This is the also case for the distribution of changes in college success rates (see Figure 36 and Figure 37 below).
Retention rate

Figure 38 and Figure 39 below show that the retention rates are very close for the sample and the whole population for both 16-18 year olds and adult learners.
Annex 1: Comparing the sample to all colleges

**Achievement rate**

Figure 40 and Figure 41 below show that the achievement rates are similar for the sample and the whole population for both 16-18 year olds and adult learners.

Figure 39: Average adult learner retention rates by academic year for sample and population

Figure 40: Average 16-18 achievement rates by academic year for sample and population

Figure 41: Average adult learner achievement rates by academic year for sample and population
Dependency on LSC income

Figure 42 below shows how average dependency on LSC income for the sample and the whole population changes over time.

The relationship between the sample and the whole population is close. Although there are slight discrepancies in a few years, none are large. The difference peaks in the final year 2006-07 at 1.9 percentage points. The dependency on LSC income data for our sample therefore provides a good fit to the whole population.

College location

Figure 43 below compares the regional breakdown of colleges in the sample to those in the whole population.

The sample and the whole population have similar regional break downs. There is some overrepresentation of the South West and an underrepresentation of the South East. This implies that we need to control for regions in our regressions.
Annex 2: Participation regressions

As outlined in Section 5.1, the participation measure we used for our analysis was the change in the number of learners in each college between 1998/99 and 2006/07. This allowed us to compare the effect of capital expenditure on the change in participation over this period using regression analysis. The regression outputs are presented in this Annex.

In order to conduct regression analysis, we assumed the following linear model specification\(^55\):

\[
\Delta P_i = b_0 + b_1 I_i + \sum b_{ij} C_{ij} + \varepsilon_i
\]

where

- \(\Delta P_i\) = change in participation for college \(i\), 1998/99 and 2006/07
- \(I_i\) = total capital expenditure by college \(i\), 1998/99 and 2006/07
- \(C_{ij}, C_{i2}, ...,\) = other characteristics for college \(i\) (control variables)
- \(b_0, b_1, ...,\) = coefficients to be estimated by regression analysis
- \(\varepsilon_i\) = error term for college \(i\) (this picks up other influences on the change in participation for which we cannot control)

Regression results

The regression results presented below examine the relationship between the absolute change in participation and the value of capital expenditure undertaken between 1998/99 and 2006/07. Four separate regressions were run, each looking at the effect of capital expenditure on a different measure of participation.

- **Regression P1** – Effect of capital expenditure on total student numbers.
- **Regression P2** – Effect of capital expenditure on full-time-equivalent (FTE) student numbers.
- **Regression P3** – Effect of capital expenditure on the number of 16-18 year old learners.
- **Regression P4** – Effect of capital expenditure on the number of adult learners.

\(^55\) We also tested quadratic and log-linear model specifications. However, these non-linear specifications did not appear to improve the model fit.
## Annex 2: Participation regressions

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Impact on the Change in participation between 1998/99 and 2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reg P1</td>
</tr>
<tr>
<td>Total capital expenditure between 1998/99 and 2006/07 (£ million)</td>
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</tr>
<tr>
<td>Number of learners at college in 1998/99 (hundreds)</td>
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<td>College is in the West Midlands</td>
<td>-19</td>
</tr>
<tr>
<td>College is in the Yorkshire and Humberside</td>
<td>-1399</td>
</tr>
<tr>
<td>College is GFEC</td>
<td>699</td>
</tr>
<tr>
<td>College is SFC</td>
<td>1498</td>
</tr>
<tr>
<td>College merged between 1998/99 and 2006/07</td>
<td>4773**</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>-5590**</td>
</tr>
<tr>
<td>Constant</td>
<td>4568*</td>
</tr>
<tr>
<td>Number of observations</td>
<td>143</td>
</tr>
<tr>
<td>R²</td>
<td>0.57</td>
</tr>
<tr>
<td>Root mean squared error</td>
<td>3558</td>
</tr>
</tbody>
</table>

Table 10: Participation regression results

*Source: Frontier Economics*

** Significant at the 5% level  * Significant at the 10% level

*‘Base case’ dummy variable parameters: college is from East Midlands and is neither a GFEC nor a SFC*

The key results from this table are as follows.

- **Regression P1** indicates that capital expenditure had a positive impact on participation: for every additional £1 million spent, participation increased, on average, by 111 learners.
Regression P2 indicates that capital expenditure had a positive impact on full-time-equivalent (FTE) participation numbers: for every additional £1 million spent, FTE participation increased, on average, by 66 learners.

Regression P3 provides some evidence that capital expenditure had a positive impact on 16-18 year old learner numbers: the top coefficient indicates that for every additional £1 million spent, 16-18 year old participation increased, on average, by 46 learners. However this result is not statistically significant.

Regression P4 indicates that capital expenditure had a positive impact on adult learner participation: for every additional £1 million spent, adult learner numbers increased, on average, by 65 learners.
Annex 3: Learner performance results

As discussed in Section 5.2, we were interested in testing the effect of capital expenditure on three measures of attainment:

- a college’s success rate (the number of qualifications achieved as a percentage of the number started);
- a college’s retention rate (the number of qualifications completed as a percentage of the number started); and
- a college’s achievement rate (the number of qualifications achieved as a percentage of the number completed).

In order to conduct regression analysis, we assumed the following linear model specification (similar to that used for the participation regressions):

\[ \Delta S_i = a_0 + a_1 I_i + \sum_j a_{j,i} G_j + \epsilon_i \]

where

- \( \Delta S_i \) = change in success rate for college \( i \), 2000/01 - 2006/07 (or alternatively the change in achievement or retention rate in the case of the achievement and retention regressions)
- \( I_i \) = total capital expenditure by college \( i \), 1998/99 - 2006/07
- \( G_{j,i}, G_{j,2} \ldots \) = other characteristics for college \( i \) (control variables)
- \( a_0, a_1, \ldots \) = coefficients to be estimated by regression analysis
- \( \epsilon_i \) = error term for college \( i \)

Success regression results

The regression results presented below examine the relationship between the value of capital expenditure undertaken between 1998/99 and 2006/07 and the corresponding percentage-point change in the success rate. Six separate regressions were run, each looking at the effect of capital expenditure on a different measure of success.

- **Regression S1** – Effect of capital expenditure on the overall success rate for all colleges.
- **Regression S2** – Effect of capital expenditure on the 16-18 year old learner success rate for all colleges.
- **Regression S3** – Effect of capital expenditure on the adult learner success rate for all colleges.
- **Regression S4** – Effect of capital expenditure on the overall success rate for colleges with initially above-average success rates.
Regression S5 – Effect of capital expenditure on the overall success rate for colleges with initially below-average success rates.

Regression S6 – Effect of capital expenditure on the overall success rate for colleges in the bottom 20% for initial success rates.

The results for Regressions S1, S2 and S3 are reported in Table 11, while the results for Regressions S4, S5, and S6 are reported in Table 12.
### Table 11: Results for success rate regressions S1, S2 and S3

**Source:** Frontier Economics

** Significant at the 5% level    * Significant at the 10% level

'Base case' dummy variable parameters: college is from East Midlands and is neither a GFEC nor a SFC

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Impact on the percentage point change in success between 2000/01 and 2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reg S1</td>
</tr>
<tr>
<td>Total capital expenditure approved since 1998 and completed before October 2006 (£ million)</td>
<td>0.09**</td>
</tr>
<tr>
<td>Total capital expenditure exceeded $50 million over this period</td>
<td>-10.12**</td>
</tr>
<tr>
<td>Number of learners at college in 2000/01 (hundreds)</td>
<td>0.00</td>
</tr>
<tr>
<td>College success rate in 2000/01</td>
<td>-0.79**</td>
</tr>
<tr>
<td>College is in the East of England</td>
<td>-0.40</td>
</tr>
<tr>
<td>College is in London</td>
<td>-0.71</td>
</tr>
<tr>
<td>College is in the North East</td>
<td>0.45</td>
</tr>
<tr>
<td>College is in the North West</td>
<td>0.00</td>
</tr>
<tr>
<td>College is in the South East</td>
<td>-0.06</td>
</tr>
<tr>
<td>College is in the South West</td>
<td>-1.32</td>
</tr>
<tr>
<td>College is in the West Midlands</td>
<td>-0.41</td>
</tr>
<tr>
<td>College is in the Yorkshire and Humberside</td>
<td>-1.76</td>
</tr>
<tr>
<td>College is a General Further Education College</td>
<td>-4.02</td>
</tr>
<tr>
<td>College is a Sixth Form College</td>
<td>-0.92</td>
</tr>
<tr>
<td>College merged between 1998/99 and 2006/07</td>
<td>-1.02</td>
</tr>
<tr>
<td>Total capital expenditure approved or undertaken since October 2006</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>0.07</td>
</tr>
<tr>
<td>Constant</td>
<td>64.54**</td>
</tr>
<tr>
<td>Number of observations</td>
<td>146</td>
</tr>
<tr>
<td>R^2</td>
<td>0.70</td>
</tr>
<tr>
<td>Root mean squared error</td>
<td>0.519</td>
</tr>
</tbody>
</table>

Annex 3: Learner performance results
### Coefficient Impact on the percentage point change in success between 2000/01 and 2006/07

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Reg S4</th>
<th>Reg S5</th>
<th>Reg S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total capital expenditure approved since 1998 and completed before October 2006 (£ million)</td>
<td>0.21**</td>
<td>0.02</td>
<td>0.19*</td>
</tr>
<tr>
<td>Total capital expenditure exceeded $50 million over this period</td>
<td>-14.56**</td>
<td>-8.77**</td>
<td>-</td>
</tr>
<tr>
<td>Number of learners at college in 2000/01 (hundreds)</td>
<td>0.00</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>College success rate in 2000/01</td>
<td>-0.61**</td>
<td>-0.98**</td>
<td>-1.12**</td>
</tr>
<tr>
<td>College is in the East of England</td>
<td>-0.68</td>
<td>2.06</td>
<td>4.12</td>
</tr>
<tr>
<td>College is in London</td>
<td>2.09</td>
<td>0.32</td>
<td>10.78</td>
</tr>
<tr>
<td>College is in the North East</td>
<td>-1.58</td>
<td>7.77**</td>
<td>-</td>
</tr>
<tr>
<td>College is in the North West</td>
<td>0.16</td>
<td>2.22</td>
<td>13.48</td>
</tr>
<tr>
<td>College is in the South East</td>
<td>-1.02</td>
<td>3.16</td>
<td>9.24</td>
</tr>
<tr>
<td>College is in the South West</td>
<td>-2.67</td>
<td>1.69</td>
<td>9.53</td>
</tr>
<tr>
<td>College is in the West Midlands</td>
<td>-1.96</td>
<td>6.47**</td>
<td>6.36**</td>
</tr>
<tr>
<td>College is in the Yorkshire and Humberside</td>
<td>-0.90</td>
<td>0.57</td>
<td>10.59</td>
</tr>
<tr>
<td>College is a General Further Education College</td>
<td>-1.22</td>
<td>-6.19**</td>
<td>-14.13**</td>
</tr>
<tr>
<td>College is a Sixth Form College</td>
<td>4.19</td>
<td>-8.26**</td>
<td>-4.11</td>
</tr>
<tr>
<td>College merged between 1998/99 and 2006/07</td>
<td>-0.73</td>
<td>-1.45</td>
<td>-6.61*</td>
</tr>
<tr>
<td>Total capital expenditure approved or undertaken since October 2006</td>
<td>0.00**</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>0.02</td>
<td>0.13**</td>
<td>0.08</td>
</tr>
<tr>
<td>Constant</td>
<td>49.84**</td>
<td>72.74**</td>
<td>72.50**</td>
</tr>
<tr>
<td>Number of observations</td>
<td>77</td>
<td>69</td>
<td>28</td>
</tr>
<tr>
<td>R²</td>
<td>0.42</td>
<td>0.77</td>
<td>0.84</td>
</tr>
<tr>
<td>Root mean squared error</td>
<td>0.532</td>
<td>0.452</td>
<td>0.046</td>
</tr>
</tbody>
</table>

Table 12: Results for success rate regressions S4, S5 and S6

Source: Frontier Economics

** Significant at the 5% level  * Significant at the 10% level

‘Base case’ dummy variable parameters: college is from East Midlands and is neither a GFEC nor a SFC

Annex 3: Learner performance results
The key results from this table are as follows.

- **Regression S1** indicates that for every additional £1 million spent the overall success rate increased by, on average, 0.09 percentage points.

- **Regression S2** indicates that for every additional £1 million spent the success rate for 16-18 year old learners increased by, on average, 0.04 percentage points. This result was not statistically significant, however.

- **Regression S3** indicates that for every additional £1 million spent the success rate for adult learners increased by, on average, 0.16 percentage points.

- **Regression S4** indicates that for colleges with success rates that were initially above average every additional £1 million spent increased the success rate by, on average, 0.21 percentage points.

- **Regression S5** suggests that for colleges with success rates that were initially below average every additional £1 million spent increased the success rate by, on average, 0.02 percentage points. This result was not statistically significant, however.

- **Regression S6** suggests that for colleges with success rates that were initially in the bottom 20% of the sample every additional £1 million spent increased the success rate by, on average, 0.19 percentage points.

**Retention regression results**

The regression results presented in Table 13 below examine the relationship between the value of capital expenditure undertaken between 1998/99 and 2006/07 and the corresponding percentage-point change in the retention rate. Three separate regressions were run, each looking at the effect of capital expenditure on a different measure of retention.

- **Regression R1** – Effect of capital expenditure on the overall retention rate for all colleges.

- **Regression R2** – Effect of capital expenditure on the 16-18 year old learner retention rate for all colleges.

- **Regression R3** – Effect of capital expenditure on the adult learner retention rate for all colleges.
### Impact on the percentage point change in retention between 2000/01 and 2006/07

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Reg R1</th>
<th>Reg R2</th>
<th>Reg R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total capital expenditure approved since 1998 and completed before October 2006 (£ million)</td>
<td>0.06*</td>
<td>0.02</td>
<td>0.10**</td>
</tr>
<tr>
<td>Total capital expenditure exceeded $50 million</td>
<td>-4.77**</td>
<td>-6.01**</td>
<td>-7.31**</td>
</tr>
<tr>
<td>No. of learners at college in 2000/01 (hundreds)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>College retention rate in 2000/01</td>
<td>-0.86**</td>
<td>-0.80**</td>
<td>-0.92**</td>
</tr>
<tr>
<td>College is in the East of England</td>
<td>-1.21</td>
<td>-1.86</td>
<td>-0.01</td>
</tr>
<tr>
<td>College is in London</td>
<td>-0.97</td>
<td>-1.20</td>
<td>0.58</td>
</tr>
<tr>
<td>College is in the North East</td>
<td>-0.07</td>
<td>-0.55</td>
<td>1.58</td>
</tr>
<tr>
<td>College is in the North West</td>
<td>-2.01</td>
<td>-2.45</td>
<td>-1.14</td>
</tr>
<tr>
<td>College is in the South East</td>
<td>-2.73</td>
<td>-3.31**</td>
<td>-2.26</td>
</tr>
<tr>
<td>College is in the South West</td>
<td>-2.90*</td>
<td>-2.52</td>
<td>-3.03</td>
</tr>
<tr>
<td>College is in the West Midlands</td>
<td>-0.87</td>
<td>-0.61</td>
<td>-2.03</td>
</tr>
<tr>
<td>College is in the Yorkshire and Humberside</td>
<td>-1.92</td>
<td>-1.92</td>
<td>-0.66</td>
</tr>
<tr>
<td>College is a General Further Education College</td>
<td>-2.48**</td>
<td>-2.00*</td>
<td>-3.00*</td>
</tr>
<tr>
<td>College is a Sixth Form College</td>
<td>1.19</td>
<td>1.81</td>
<td>-1.52</td>
</tr>
<tr>
<td>College merged between 1998/99 and 2006/07</td>
<td>-0.76</td>
<td>0.11</td>
<td>-1.20</td>
</tr>
<tr>
<td>Total capital expenditure approved or undertaken since October 2006</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>0.04*</td>
<td>0.03</td>
<td>-0.07</td>
</tr>
<tr>
<td>Constant</td>
<td>77.70**</td>
<td>73.11**</td>
<td>83.71**</td>
</tr>
<tr>
<td>Number of observations</td>
<td>146</td>
<td>145</td>
<td>134</td>
</tr>
<tr>
<td>R²</td>
<td>0.79</td>
<td>0.75</td>
<td>0.77</td>
</tr>
<tr>
<td>Root mean squared error</td>
<td>0.033</td>
<td>0.033</td>
<td>0.048</td>
</tr>
</tbody>
</table>

Table 13: Retention regression results

Source: Frontier Economics

** Significant at the 5% level  * Significant at the 10% level

‘Base case’ dummy variable parameters: college is from East Midlands and is neither a GFEC nor a SFC
Achievement regression results

The regression results presented in Table 14 below examine the relationship between the value of capital expenditure undertaken between 1998/99 and 2006/07 and the corresponding percentage-point change in the achievement rate. Three separate regressions were run, each looking at the effect of capital expenditure on a different measure of achievement.

- **Regression A1** – Effect of capital expenditure on the overall achievement rate for all colleges.
- **Regression A2** – Effect of capital expenditure on the 16-18 year old learner achievement rate for all colleges.
- **Regression A3** – Effect of capital expenditure on the adult learner achievement rate for all colleges.
<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Impact on the percentage point change in achievement between 2000/01 and 2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reg A1</td>
</tr>
<tr>
<td>Total capital expenditure approved since 1998 and completed before October 2006 (£ million)</td>
<td>0.04</td>
</tr>
<tr>
<td>Total capital expenditure exceeded $50 million</td>
<td>-5.95**</td>
</tr>
<tr>
<td>No. of learners at college in 2000/01 (hundreds)</td>
<td>0.01</td>
</tr>
<tr>
<td>College achievement rate in 2000/01</td>
<td>-0.90**</td>
</tr>
<tr>
<td>College is in the East of England</td>
<td>0.34</td>
</tr>
<tr>
<td>College is in London</td>
<td>-0.99</td>
</tr>
<tr>
<td>College is in the North East</td>
<td>-0.01</td>
</tr>
<tr>
<td>College is in the North West</td>
<td>1.70</td>
</tr>
<tr>
<td>College is in the South East</td>
<td>1.96</td>
</tr>
<tr>
<td>College is in the South West</td>
<td>0.93</td>
</tr>
<tr>
<td>College is in the West Midlands</td>
<td>0.26</td>
</tr>
<tr>
<td>College is in the Yorkshire and Humberside</td>
<td>-0.50</td>
</tr>
<tr>
<td>College is a General Further Education College</td>
<td>-2.49</td>
</tr>
<tr>
<td>College is a Sixth Form College</td>
<td>-2.09</td>
</tr>
<tr>
<td>College merged between 1998/99 and 2006/07</td>
<td>-0.05</td>
</tr>
<tr>
<td>Total capital expenditure approved or undertaken since October 2006</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>0.04</td>
</tr>
<tr>
<td>Constant</td>
<td>80.20**</td>
</tr>
<tr>
<td>Number of observations</td>
<td>146</td>
</tr>
<tr>
<td>R²</td>
<td>0.85</td>
</tr>
<tr>
<td>Root mean squared error</td>
<td>0.039</td>
</tr>
</tbody>
</table>

Table 14: Achievement regression results

Source: Frontier Economics

* Significant at the 5% level    ** Significant at the 10% level

'Base case' dummy variable parameters: college is from East Midlands and is neither a GFEC nor a SFC
The key results from the retention and achievement regression tables are as follows.

- **Regression R1** indicates that for every additional £1 million spent the overall retention rate increased by, on average, 0.06 percentage points.

- **Regression R2** indicates that for every additional £1 million spent the retention rate for 16-18 year old learners increased by, on average, 0.02 percentage points. This result was not statistically significant, however.

- **Regression R3** indicates that for every additional £1 million spent the retention rate for adult learners increased by, on average, 0.10 percentage points.

- **Regression A1** indicates that for every additional £1 million spent the overall achievement rate increased by, on average, 0.04 percentage points. This result was not statistically significant, however.

- **Regression A2** indicates that for every additional £1 million spent the achievement rate for 16-18 year old learners increased by, on average, 0.01 percentage points. This result was not statistically significant, however.

- **Regression A3** indicates that for every additional £1 million spent the achievement rate for adult learners increased by, on average, 0.07 percentage points. This result was not statistically significant, however.
Annex 4: Fee income regression results

The regression results presented in Table 15 below examine the relationship between the value of capital expenditure undertaken between 1998/99 and 2006/07 and corresponding percentage-point change in a college’s dependency on the LSC for income.

The results provide little evidence that capital expenditure had any effect on the subsequent change in a college’s dependency on the LSC for income.
<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Impact on the percentage point change in dependency on LSC for income between 2000/01 and 2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total capital expenditure approved since 1998 and completed before October 2006 (£ million)</td>
<td>-0.03</td>
</tr>
<tr>
<td>Total capital expenditure exceeded $50 million over this period</td>
<td>6.69**</td>
</tr>
<tr>
<td>Number of learners at college in 1998/99 (hundreds)</td>
<td>-0.02**</td>
</tr>
<tr>
<td>College achievement rate in 2000</td>
<td>-0.29**</td>
</tr>
<tr>
<td>College is in the East of England</td>
<td>3.43</td>
</tr>
<tr>
<td>College is in London</td>
<td>1.00</td>
</tr>
<tr>
<td>College is in the North East</td>
<td>0.68</td>
</tr>
<tr>
<td>College is in the North West</td>
<td>0.65</td>
</tr>
<tr>
<td>College is in the South East</td>
<td>3.14</td>
</tr>
<tr>
<td>College is in the South West</td>
<td>0.84</td>
</tr>
<tr>
<td>College is in the West East</td>
<td>4.63**</td>
</tr>
<tr>
<td>College is in the Yorkshire and Humberside</td>
<td>-1.09</td>
</tr>
<tr>
<td>College is a General Further Education College</td>
<td>9.62**</td>
</tr>
<tr>
<td>College is a Sixth Form College</td>
<td>5.26</td>
</tr>
<tr>
<td>College has merged between 1998/99 and 2006/07</td>
<td>0.75</td>
</tr>
<tr>
<td>Total capital expenditure approved or undertaken since October 2006</td>
<td>0.00*</td>
</tr>
<tr>
<td>Proportion of learners aged 16-18</td>
<td>0.05*</td>
</tr>
<tr>
<td>Constant</td>
<td>17.51**</td>
</tr>
<tr>
<td>Number of observations</td>
<td>140</td>
</tr>
<tr>
<td>$^2$</td>
<td>0.48</td>
</tr>
<tr>
<td>Root mean squared error</td>
<td>0.049</td>
</tr>
</tbody>
</table>

Table 15: Dependency on LSC income regression results

Source: Frontier Economics

** Significant at the 5% level   * Significant at the 10% level
‘Base case’ dummy variable parameters: college is from East Midlands and is neither a GFEC nor a SFC
Annex 5: Further evidence from case studies

APPRIASAL AND PLANNING
The college is faced with a number of choices during the appraisal process. Some particular considerations at this stage are the location, financing and design of the new building.

Location
Typically, colleges considered a range of options within the town before embarking on a capital expenditure project. These included a simple refurbishment of the existing site, sale of some of the existing estate and relocation to a new site.

Relocation closer to the city centre was an important factor in some new builds. In one example, developments in a particular area of the city at the time of the appraisal process offered an attractive opportunity to become part of a thriving area. Another college carried out a postcode analysis of learners attending the college which revealed that the college was located in the wrong area of the town. The capital project allowed the college to address this problem.

One college formed via a merger of three colleges used the capital expenditure project to consolidate provision on three disparate sites to two principal sites in the town centre. This made the college more accessible so that learners only had to make one journey to the college (rather than multiple bus journeys). Here, the college also wanted to change student perception of the college. Opting to build on a completely new site allowed them to present the college as a new opportunity, distinguishing them from existing college provision.

Finance
When we spoke with individuals responsible for finance at the college, we asked how the budget for the project was set. The response was generally that the budget was something the college felt they did not control. LSC space requirements, associated cost norms per unit area and the availability of capital receipts effectively governed the total cost of the capital expenditure project.

(a) Financial recovery
Three colleges we visited had implemented a financial recovery plan in place prior to the capital expenditure project. This was a painful process with staffing one area where costs were cut. Colleges which successfully implemented these changes found themselves with an operating surplus and strong financial position. This provided them with the option to implement a capital expenditure project without reliance on borrowing or LSC funding. However, one mid-sized college told us that they feel they had been punished for this as they received a lower level of LSC support for the project than colleges which had previously been poorly managed.
Historically, colleges applying for capital funding had received 35% of total project costs as support. Only colleges who were in a strong financial position and could fund the remainder of the project from reserves and borrowing therefore undertook projects. The level of support is now variable. One college pointed out that the effect of this change could be to allow colleges with weak financial positions to apply for capital support as a way to overcome more fundamental difficulties. They pointed out that unless the capital project was accompanied by a change in management, the problems are likely to persist.

(b) Land sales

One financing option available to some colleges was to sell some of their existing estate. The advantage of this approach was that it provided an instant cash lump-sum rather than requiring a prolonged period of strict financial management to finance the project.

A mid-sized college considering a change of location was informed that they would be able to sell their current site for a considerable amount. The budget for the project was influenced by the value of this disposal and the LSC contribution. For another college, bank borrowing had to be limited to 30% of projected income. This still presented a major risk for the college given their dire financial status. Land sales (and a contribution from the LSC) were needed to finance the remainder of the project. The consequence now is that the college no longer has any land left to accommodate expansion.

(c) Space

LSC guidelines are fairly prescriptive in terms of how much space the college is allowed. The only scope for negotiation is over forecast growth in student numbers. Once the area of the building has been determined, the budget is set according to cost norms.

The LSC considered that the growth projections of one large college were over-ambitious. In fact, the college exceeded their forecast growth in participation and have been forced to add additional capacity. The implication is that colleges need to present a stronger educational case to the LSC in order to justify further space. This case can be backed up with reference to similar colleges that have achieved participation growth in excess of forecasts.

Design

Individual elements of the building design that were mentioned consistently by the colleges we visited were flexibility, security, fitness for purpose and visibility.

(a) Flexibility

The primary tool to make the building flexible was using removable partitions rather than solid walls to divide rooms. This involved putting the wiring and infrastructure in the floor or ceiling rather than in the walls. The ability to change room sizes helped colleges deal with unexpected changes in demand or in LSC funding.
Even in specialist areas, it appears quite easy to convert space and respond to changes in demand. An example of this was where a travel shop was used to accommodate growth in hair and beauty. Flexible design also extended to the atrium space, which could be used for a range of functions (enrolment, graduation ceremonies, student exhibitions etc.).

(b) Behaviour and security

An important consideration when designing the building was how to improve student behaviour. There were a number of measures suggested. The most common of these was to create a single, controlled entrance. Whilst this has generally proved successful, at one college the entrance was too small and created a bottleneck when learners came into the college.

An identified benefit of open plan design and glass walls was that there were no dark corners and no place to hide for learners. Some colleges consciously chose to locate staff rooms amongst student areas as a way to promote good discipline. In two colleges we visited, this principle extended as far as common staff and student toilets.

(c) Fitness for purpose

When designing the building, several colleges identified a desire to move away from a ‘traditional’ educational building to one that resembled an airport terminal or a shopping centre. The aim was for vocational training areas (e.g. hairdressing salons) to simulate a retail environment. The design of the building therefore intended to make the college more fit for purpose.

(d) Visibility

Four colleges we visited specifically mentioned a desire to create a landmark building which acted as a focal point for learners. The preference therefore was for tall buildings with large open atria. This ensured the college was a prominent feature on the local landscape, with one college in the north even visiting other parts of the city to assess how visible the new building would be.

The choice of building design here can also impact on employer’s perception of the college and influence the ability of the college to meet the objective of increased employer engagement.

IMPLEMENTATION AND MONITORING

Consultation

(a) Management structure

Colleges differed in the extent to which governors were involved in the capital expenditure project. The most successful projects tended to be those where the governors provided specialist advice in their areas of expertise (such as finance and legal issues) but entrusted the Senior Management Team (SMT) with the responsibility for delivering the project.
Two colleges said that appointing influential individuals to the College Board helped the project gain momentum and that drawing on the specific expertise of the Board was useful. Another mid-sized college told us a different story – namely that the lack of a construction expert on the board reduced the ability of governors to ‘second-guess’ the builders. Finally, one college told us that Governors had too much control, effectively managing the project without the involvement of the SMT. This was said to have resulted in a number of mistakes being made in the project.

Within the Senior Management Team, the role of the Principal also differed between colleges. This ranged from procuring door handles directly to minimal involvement with the project. The message is that as long as it is clear who will have the final decision, the project will be successful.

One aspect of management structure which appeared to work well was dedicating an individual to the project full time. Whether this was a Vice Principal, Estates Director or Finance Director, several colleges mentioned that relieving them of their day-to-day responsibilities proved effective. In particular, a dedicated project sponsor tended to have more involvement directly with contractors to oversee the project, make quick decisions and control exactly what was being built. One project sponsor told us that ‘requests for decisions were constantly coming at you’.

**Good practice in decision making**

One particularly good example of a college with a clear decision-making structure outlined the responsibilities for groups ranging from the full governing body down to the SMT working groups and lead consultant team.

A matrix was developed where each decision during the planning phase of the project was matched with the level at which the decision was to be made. This matrix clearly set out who was to originate, recommend, approve or endorse each decision.

**(b) Staff consultation**

All of the colleges we met with talked about how they involved staff in the new build. The typical approach was to involve curriculum staff in the design of the new building via user groups. Several colleges found this process ineffective as staff did not understand the need to reduce space and simply asked for the same equipment as they had in the previous building. There was a need for project managers and estates managers to outline how space requirements constrained the wishes of curriculum staff. This was aided by having a project manager with a background in teaching (rather than estates) who could distinguish required equipment from an ideal ‘wish list’.

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56 Interestingly only one college talked of taking learners (other than construction learners) to see the new layout.
Another initiative which involved curriculum staff was the creation of mock classrooms, allowing staff to visualise the design and layout of a standard classroom in the new building. Finally, the appointment of ‘move champions’ in each curriculum area helped gain staff support for the project.

Three colleges we visited implemented a comprehensive purge of unnecessary files and paperwork during the move. The move to a paperless office eventually proved unsuccessful for two colleges and this objective was eventually abandoned. In one case, the Principal found that within six months of the initial purge, staff were again trying to replicate previous working styles in terms of equipment and another purge was necessary.

There were mixed views on the move to open plan staff rooms, a change implemented by a number of colleges we visited. Some colleges thought that the open plan environment helped communication between staff; others found the noisy environment presented a problem.

(c) External advice

An important element of a successful project was a well-specified building contract. Colleges recommended taking the time to comprehensively draw this up, even at the expense of delaying the start of the building work. Taking legal advice is a related and important factor, as disputes can still arise during the course of a project.

Several colleges we visited recommended investing in tax planning. In particular, the ability to recover VAT via the Lennartz principle gave colleges more financial flexibility during the project. One southern college however warned against factoring tax savings into a project – achieving these can often be a lengthy process with no guarantee of a successful outcome.

External contractors

Procurement

The two most important requirements identified by colleges when selecting contractors were that they (i) were responsive to the needs of the college; and (ii) had previous experience in the education sector. Colleges benefited from appointing a local firm able to respond quickly and in person to any issues relating to the new build. During the procurement process, colleges preferred presentations from local managers who would actually be managing the project rather than sales personnel in a national organisation.

Contractors who assumed that they understood the requirements of the college prior to the project were rejected in favour of those who were willing to discuss the particular objectives of the college for the new build. When a contractor was

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57 From November 2007 onwards, the cash flow benefits of the Lennartz principle have been curtailed by HMRC.
changed midway through the project, this was because the building was not fit for purpose as an educational establishment.

Communication

When we spoke with project managers, they highlighted the importance of regular contact with lead contractors. For some, this was in the form of regular meetings, for others this involved being present on the site to make quick decisions on a particular issue. Without this level of involvement, they highlighted the danger that contractors would make changes to the design without the knowledge of the college. This close relationship also assists contractors in completing each phase of the project on time.

Architects on the project often held discussions with curriculum staff on the design and layout of each curriculum area. Although these were productive, particularly in the design of specialist curriculum areas, there needs to be a clearly specified time after which no further changes to the design are permitted.

Time and budget

A key decision that the colleges needed to make was whether to adopt a design and build contract or to follow the traditional approach to procurement. Our understanding is that whilst the LSC recommends a design and build rather than a direct approach to contracting, this approach is not imposed on colleges.

Below, we discuss the merits of each approach with reference to three key areas: design changes; value engineering; and contingency funds.

Design changes

The key message here is that changes in a design and build contract are time-consuming, expensive, and should be avoided if at all possible. One project sponsor stated that rather than change design midway through the project, the advice he would give to other colleges would be to ‘build it wrong and change it later’. Another advocated moving into the new building and finding the ‘pinch points’, rather than making changes to the design and build contract.

Most colleges that favour traditional procurement do so as they say it provides added flexibility during the build process. The premise is that no college will get the building right first time. The option to change the design either in response to an identified mistake or to a change in the external environment (i.e. when adult funding was cut) can therefore be very valuable.

Value engineering

A drawback of a design and build process is that if costs increase unexpectedly in one area, offsetting cuts are needed in another area. Under traditional procurement methods, the college has the option to assess accumulated costs to that point when making decisions during the project.

One college opted to shorten and remove some bridges in the atrium as part of a value engineering process. This ended up having a positive effect on the college as the atrium can now be used as a large open space in which to hold graduation
ceremonies. Where the quality of the building was important the college chose not to compromise on quality (i.e. by insisting on carpets) and have instead made savings in other areas (e.g. the stairwells).

Value engineering can also have a negative impact on college performance. One example of this was at a Midlands college where air conditioning was not originally installed in the new building. This has subsequently been retrofitted at around double the original cost.

**Contingency funds**

An advantage of design and build contracts is that contingency funds for the project do not need to be particularly large.

Generally, colleges thought contingency funds were sufficient to cover unexpected costs. However, one southern college advised keeping a 10% contingency fund to resolve unforeseen contractual issues and to accommodate changes in a design and build contract.

**Managing disruption**

**Transfer of existing provision**

Each capital project was accompanied by a need to transfer existing provision between sites. In general, this was the responsibility of the estates team. One college talked with a moving specialist who helped them understand what was involved in the move (and ended up contracting with them for the move!) As with the procurement of other services, the issue was appointing a moving specialist who understood the needs of the college. This includes not making noise when examinations are taking place and making sure equipment is in place for the start of a new term.

One tool which helped with relocation was publishing regular newsletters for staff and learners which explained (on a weekly basis) what was happening with the new build. This gave staff and learners an indication of when they would be moving into the new facility and also provided a forum to discuss issues relating to the new build.

**Student disruption**

There was little evidence presented to us by colleges that participation declined or student complaints increased during the build period. Even though it was perhaps not current learners who would benefit from the new build, anecdotal evidence suggested that learners were excited by the prospect of the new build rather than disadvantaged by it. There was only one exception where the simultaneous demolition and rebuild of the college site did affect some HE numbers during the build process.

**Managing contractors**

An important issue in managing the build process concerned phased implementation of the project. One such project consisted of around 14 phases,
whilst another only gave the contractors access to certain areas when another area had been delivered back to the college. The key to success in this area was specifying the terms of the relocation in the contract.

Finally, the relocation process was aided by controlling access to the building site. One small college restricted entrance to the site at certain times of the day when learners typically entered and left the college. Clearly cordoning off the building area helped minimise disruption to learners.
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